

SEQUENCE LISTING

<110> Regents of the University of Minnesota, et al.

5 <120> DNA encoding methymycin and pikromycin

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<151> 1998-06-26

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15 <170> FastSEQ for Windows Version 3.0

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| | | | | | |
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| 15 | <213> Streptomyces venezuelae | | | | |
| <400> 2 | | | | | |
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| 20Ala Ser Asn Pro Ala Ala Phe Trp Glu Leu Leu Arg Asn Gly Glu Ser | | | | | |
| 20 | 25 | 30 | | | |
| Ala Val Thr Asp Val Pro Ser Gly Arg Trp Thr Ser Val Leu Gly Gly | | | | | |
| 35 | 40 | 45 | | | |
| Ala Asp Ala Glu Glu Pro Ala Glu Ser Gly Val Arg Arg Gly Gly Phe | | | | | |
| 25 | 50 | 55 | 60 | | |
| Leu Asp Ser Leu Asp Leu Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro | | | | | |
| 65 | 70 | 75 | 80 | | |
| Arg Glu Ala Ala Ala Met Asp Pro Gln Gln Arg Leu Val Leu Glu Leu | | | | | |
| 85 | 90 | 95 | | | |
| 30Ala Trp Glu Ala Leu Glu Asp Ala Gly Ile Val Pro Gly Thr Leu Ala | | | | | |
| 100 | 105 | 110 | | | |
| Gly Ser Arg Thr Ala Val Phe Val Gly Thr Leu Arg Asp Asp Tyr Thr | | | | | |
| 115 | 120 | 125 | | | |
| Ser Leu Leu Tyr Gln His Gly Glu Gln Ala Ile Thr Gln His Thr Met | | | | | |
| 35 | 130 | 135 | 140 | | |
| Ala Gly Val Asn Arg Gly Val Ile Ala Asn Arg Val Ser Tyr His Leu | | | | | |
| 145 | 150 | 155 | 160 | | |
| Gly Leu Gln Gly Pro Ser Leu Thr Val Asp Ala Ala Gln Ser Ser Ser | | | | | |
| 165 | 170 | 175 | | | |
| 40Leu Val Ala Val His Leu Ala Cys Glu Ser Leu Arg Ala Gly Glu Ser | | | | | |

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|--|-----|-----|
| 180 | 185 | 190 |
| Thr Thr Ala Leu Val Ala Gly Val Asn Leu Asn Ile Leu Ala Glu Ser | | |
| 195 | 200 | 205 |
| Ala Val Thr Glu Glu Arg Phe Gly Gly Leu Ser Pro Asp Gly Thr Ala | | |
| 5 210 | 215 | 220 |
| Tyr Thr Phe Asp Ala Arg Ala Asn Gly Phe Val Arg Gly Glu Gly Gly | | |
| 225 | 230 | 235 |
| Gly Val Val Val Leu Lys Pro Leu Ser Arg Ala Leu Ala Asp Gly Asp | | |
| 245 | 250 | 255 |
| 10 Arg Val His Gly Val Ile Arg Ala Ser Ala Val Asn Asn Asp Gly Ala | | |
| 260 | 265 | 270 |
| Thr Pro Gly Leu Thr Val Pro Ser Arg Ala Ala Gln Glu Lys Val Leu | | |
| 275 | 280 | 285 |
| Arg Glu Ala Tyr Arg Lys Ala Ala Leu Asp Pro Ser Ala Val Gln Tyr | | |
| 15 290 | 295 | 300 |
| Val Glu Leu His Gly Thr Gly Thr Pro Val Gly Asp Pro Ile Glu Ala | | |
| 305 | 310 | 315 |
| Ala Ala Leu Gly Ala Val Leu Gly Ser Ala Arg Pro Ala Asp Glu Pro | | |
| 325 | 330 | 335 |
| 20 Leu Leu Val Gly Ser Ala Lys Thr Asn Val Gly His Leu Glu Gly Ala | | |
| 340 | 345 | 350 |
| Ala Gly Ile Val Gly Leu Ile Lys Thr Leu Leu Ala Leu Gly Arg Arg | | |
| 355 | 360 | 365 |
| Arg Ile Pro Ala Ser Leu Asn Phe Arg Thr Pro His Pro Asp Ile Pro | | |
| 25 370 | 375 | 380 |
| Leu Asp Thr Leu Gly Leu Asp Val Pro Asp Gly Leu Arg Glu Trp Pro | | |
| 385 | 390 | 395 |
| His Pro Asp Arg Glu Leu Leu Ala Gly Val Ser Ser Phe Gly Met Gly | | |
| 405 | 410 | 415 |
| 30 Gly Thr Asn Ala His Val Val Leu Ser Glu Gly Pro Ala Gln Gly Gly | | |
| 420 | 425 | 430 |
| Glu Gln Pro Gly Ile Asp Glu Glu Thr Pro Val Asp Ser Gly Ala Ala | | |
| 435 | 440 | 445 |
| Leu Pro Phe Val Val Thr Gly Arg Gly Glu Ala Leu Arg Ala Gln | | |
| 35 450 | 455 | 460 |
| Ala Arg Arg Leu His Glu Ala Val Glu Ala Asp Pro Glu Leu Ala Pro | | |
| 465 | 470 | 475 |
| Ala Ala Leu Ala Arg Ser Leu Val Thr Thr Arg Thr Val Phe Thr His | | |
| 485 | 490 | 495 |
| 40 Arg Ser Val Val Leu Ala Pro Asp Arg Ala Arg Leu Leu Asp Gly Leu | | |

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|--|-----|-----|
| 500 | 505 | 510 |
| Gly Ala Leu Ala Ala Gly Thr Pro Ala Pro Gly Val Val Thr Gly Thr | | |
| 515 | 520 | 525 |
| Pro Ala Pro Gly Arg Leu Ala Val Leu Phe Ser Gly Gln Gly Ala Gln | | |
| 5 530 | 535 | 540 |
| Arg Thr Gly Met Gly Met Glu Leu Tyr Ala Ala His Pro Ala Phe Ala | | |
| 545 | 550 | 555 |
| Thr Ala Phe Asp Ala Val Ala Ala Glu Leu Asp Pro Leu Leu Asp Arg | | |
| 565 | 570 | 575 |
| 10 Pro Leu Ala Glu Leu Val Ala Ala Gly Asp Thr Leu Asp Arg Thr Val | | |
| 580 | 585 | 590 |
| His Thr Gln Pro Ala Leu Phe Ala Val Glu Val Ala Leu His Arg Leu | | |
| 595 | 600 | 605 |
| Val Glu Ser Trp Gly Val Thr Pro Asp Leu Leu Ala Gly His Ser Val | | |
| 15 610 | 615 | 620 |
| Gly Glu Ile Ser Ala Ala His Val Ala Gly Val Leu Ser Leu Arg Asp | | |
| 625 | 630 | 635 |
| Ala Ala Arg Leu Val Ala Ala Arg Gly Arg Leu Met Gln Ala Leu Pro | | |
| 645 | 650 | 655 |
| 20 Glu Gly Ala Met Val Ala Val Glu Ala Ser Glu Glu Val Leu | | |
| 660 | 665 | 670 |
| Pro His Leu Ala Gly Arg Glu Arg Glu Leu Ser Leu Ala Ala Val Asn | | |
| 675 | 680 | 685 |
| Gly Pro Arg Ala Val Val Leu Ala Gly Ala Glu Arg Ala Val Leu Asp | | |
| 25 690 | 695 | 700 |
| Val Ala Glu Leu Leu Arg Glu Gln Gly Arg Arg Thr Lys Arg Leu Ser | | |
| 705 | 710 | 715 |
| Val Ser His Ala Phe His Ser Pro Leu Met Glu Pro Met Leu Asp Asp | | |
| 725 | 730 | 735 |
| 30 Phe Arg Arg Val Val Glu Glu Leu Asp Phe Gln Glu Pro Arg Val Asp | | |
| 740 | 745 | 750 |
| Val Val Ser Thr Val Thr Gly Leu Pro Val Thr Ala Gly Gln Trp Thr | | |
| 755 | 760 | 765 |
| Asp Pro Glu Tyr Trp Val Asp Gln Val Arg Arg Pro Val Arg Phe Leu | | |
| 35 770 | 775 | 780 |
| Asp Ala Val Arg Thr Leu Glu Glu Ser Gly Ala Asp Thr Phe Leu Glu | | |
| 785 | 790 | 795 |
| Leu Gly Pro Asp Gly Val Cys Ser Ala Met Ala Ala Asp Ser Val Arg | | |
| 805 | 810 | 815 |
| 40 Asp Gln Glu Ala Ala Thr Ala Val Ser Ala Leu Arg Lys Gly Arg Pro | | |

| | | |
|---|------|------|
| 820 | 825 | 830 |
| Glu Pro Gln Ser Leu Leu Ala Ala Leu Thr Thr Val Phe Val Arg Gly | | |
| 835 | 840 | 845 |
| His Asp Val Asp Trp Thr Ala Ala His Gly Ser Thr Gly Thr Val Arg | | |
| 5 850 | 855 | 860 |
| Val Pro Leu Pro Thr Tyr Ala Phe Gln Arg Glu Arg His Trp Phe Asp | | |
| 865 | 870 | 875 |
| Gly Ala Ala Arg Thr Ala Ala Pro Leu Thr Ala Gly Arg Ser Gly Thr | | |
| 885 | 890 | 895 |
| 10Gly Ala Gly Thr Gly Pro Ala Ala Gly Val Thr Ser Gly Glu Gly Glu | | |
| 900 | 905 | 910 |
| Gly Glu Gly Glu Gly Ala Gly Ala Gly Gly Asp Arg Pro Ala Arg | | |
| 915 | 920 | 925 |
| His Glu Thr Thr Glu Arg Val Arg Ala His Val Ala Ala Val Leu Glu | | |
| 15 930 | 935 | 940 |
| Tyr Asp Asp Pro Thr Arg Val Glu Leu Gly Leu Thr Phe Lys Glu Leu | | |
| 945 | 950 | 955 |
| Gly Phe Asp Ser Leu Met Ser Val Glu Leu Arg Asn Ala Leu Val Asp | | |
| 965 | 970 | 975 |
| 20Asp Thr Gly Leu Arg Leu Pro Ser Gly Leu Leu Phe Asp His Pro Thr | | |
| 980 | 985 | 990 |
| Pro Arg Ala Leu Ala Ala His Leu Gly Asp Leu Leu Thr Gly Ser | | |
| 995 | 1000 | 1005 |
| Gly Glu Thr Gly Ser Ala Asp Gly Ile Pro Pro Ala Thr Pro Ala Asp | | |
| 25 1010 | 1015 | 1020 |
| Thr Thr Ala Glu Pro Ile Ala Ile Ile Gly Met Ala Cys Arg Tyr Pro | | |
| 1025 | 1030 | 1035 |
| Gly Gly Val Thr Ser Pro Glu Asp Leu Trp Arg Leu Val Ala Glu Gly | | |
| 1045 | 1050 | 1055 |
| 30Arg Asp Ala Val Ser Gly Leu Pro Thr Asp Arg Gly Trp Asp Glu Asp | | |
| 1060 | 1065 | 1070 |
| Leu Phe Asp Ala Asp Pro Asp Arg Ser Gly Lys Ser Ser Val Arg Glu | | |
| 1075 | 1080 | 1085 |
| Gly Gly Phe Leu His Asp Ala Ala Leu Phe Asp Ala Gly Phe Phe Gly | | |
| 35 1090 | 1095 | 1100 |
| Ile Ser Pro Arg Glu Ala Leu Gly Met Asp Pro Gln Gln Arg Leu Leu | | |
| 1105 | 1110 | 1115 |
| Leu Glu Thr Ala Trp Glu Ala Val Glu Arg Ala Gly Leu Asp Pro Glu | | |
| 1125 | 1130 | 1135 |
| 40Gly Leu Lys Gly Ser Arg Thr Ala Val Phe Val Gly Ala Thr Ala Leu | | |

| | | | |
|----|---|------|------|
| | 1140 | 1145 | 1150 |
| | Asp Tyr Gly Pro Arg Met His Asp Gly Ala Glu Gly Val Glu Gly His | | |
| | 1155 | 1160 | 1165 |
| | Leu Leu Thr Gly Thr Thr Pro Ser Val Met Ser Gly Arg Ile Ala Tyr | | |
| 5 | 1170 | 1175 | 1180 |
| | Gln Leu Gly Leu Thr Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser | | |
| | 1185 | 1190 | 1195 |
| | Ser Ser Leu Val Ala Leu His Leu Ala Val Arg Ser Leu Arg Gln Gly | | |
| | 1205 | 1210 | 1215 |
| | 10Glu Ser Ser Leu Ala Leu Ala Gly Gly Ala Thr Val Met Ser Thr Pro | | |
| | 1220 | 1225 | 1230 |
| | Gly Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly | | |
| | 1235 | 1240 | 1245 |
| | Arg Ser Lys Ala Phe Ser Asp Ser Ala Asp Gly Thr Ser Trp Ala Glu | | |
| 15 | 1250 | 1255 | 1260 |
| | Gly Val Gly Leu Leu Val Val Glu Arg Leu Ser Asp Ala Glu Arg Asn | | |
| | 1265 | 1270 | 1275 |
| | Gly His Pro Val Leu Ala Val Ile Arg Gly Ser Ala Val Asn Gln Asp | | |
| | 1285 | 1290 | 1295 |
| | 20Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg | | |
| | 1300 | 1305 | 1310 |
| | Val Ile Arg Gln Ala Leu Ala Asp Ala Gly Leu Thr Pro Ala Asp Val | | |
| | 1315 | 1320 | 1325 |
| | Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile | | |
| 25 | 1330 | 1335 | 1340 |
| | Glu Ala Glu Ala Ile Leu Gly Thr Tyr Gly Arg Asp Arg Gly Glu Gly | | |
| | 1345 | 1350 | 1355 |
| | Ala Pro Leu Gln Leu Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln | | |
| | 1365 | 1370 | 1375 |
| | 30Ala Ala Ala Gly Val Gly Leu Ile Lys Met Val Leu Ala Met Arg | | |
| | 1380 | 1385 | 1390 |
| | His Gly Val Leu Pro Arg Thr Leu His Val Asp Arg Pro Thr Thr Arg | | |
| | 1395 | 1400 | 1405 |
| | Val Asp Trp Glu Ala Gly Gly Val Glu Leu Leu Thr Glu Glu Arg Glu | | |
| 35 | 1410 | 1415 | 1420 |
| | Trp Pro Glu Thr Gly Arg Pro Arg Arg Ala Ala Ile Ser Ser Phe Gly | | |
| | 1425 | 1430 | 1435 |
| | Ile Ser Gly Thr Asn Ala His Ile Val Val Glu Gln Ala Pro Glu Ala | | |
| | 1445 | 1450 | 1455 |
| | 40Gly Glu Ala Ala Val Thr Thr Ala Pro Glu Ala Gly Glu Ala Gly | | |

| | 1460 | 1465 | 1470 |
|----|--|------|------|
| | Glu Ala Ala Asp Thr Thr Ala Thr Thr Thr Pro Ala Ala Val Gly Val | | |
| | 1475 | 1480 | 1485 |
| | Pro Glu Pro Val Arg Ala Pro Val Val Val Ser Ala Arg Asp Ala Ala | | |
| 5 | 1490 | 1495 | 1500 |
| | Ala Leu Arg Ala Gln Ala Val Arg Leu Arg Thr Phe Leu Asp Gly Arg | | |
| | 1505 | 1510 | 1515 |
| | Pro Asp Val Thr Val Ala Asp Leu Gly Arg Ser Leu Ala Ala Arg Thr | | |
| | 1525 | 1530 | 1535 |
| | 10 Ala Phe Glu His Lys Ala Ala Leu Thr Thr Ala Thr Arg Asp Glu Leu | | |
| | 1540 | 1545 | 1550 |
| | Leu Ala Gly Leu Asp Ala Leu Gly Arg Gly Glu Gln Ala Thr Gly Leu | | |
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| | Val Thr Gly Glu Pro Ala Arg Ala Gly Arg Thr Ala Phe Leu Phe Thr | | |
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| | Gly Gln Gly Ala Gln Arg Val Ala Met Gly Glu Glu Leu Arg Ala Ala | | |
| | 1585 | 1590 | 1595 |
| | His Pro Val Phe Ala Ala Ala Leu Asp Thr Val Tyr Ala Ala Leu Asp | | |
| | 1605 | 1610 | 1615 |
| | 20 Arg His Leu Asp Arg Pro Leu Arg Glu Ile Val Ala Ala Gly Glu Glu | | |
| | 1620 | 1625 | 1630 |
| | Leu Asp Leu Thr Ala Tyr Thr Gln Pro Ala Leu Phe Ala Phe Glu Val | | |
| | 1635 | 1640 | 1645 |
| | Ala Leu Phe Arg Leu Leu Glu His His Gly Leu Val Pro Asp Leu Leu | | |
| 25 | 1650 | 1655 | 1660 |
| | Thr Gly His Ser Val Gly Glu Ile Ala Ala Ala His Val Ala Gly Val | | |
| | 1665 | 1670 | 1675 |
| | Leu Ser Leu Asp Asp Ala Ala Arg Leu Val Thr Ala Arg Gly Arg Leu | | |
| | 1685 | 1690 | 1695 |
| | 30 Met Gln Ser Ala Arg Glu Gly Gly Ala Met Ile Ala Val Gln Ala Gly | | |
| | 1700 | 1705 | 1710 |
| | Glu Ala Glu Val Val Glu Ser Leu Lys Gly Tyr Glu Gly Arg Val Ala | | |
| | 1715 | 1720 | 1725 |
| | Val Ala Ala Val Asn Gly Pro Thr Ala Val Val Val Ser Gly Asp Ala | | |
| 35 | 1730 | 1735 | 1740 |
| | Asp Ala Ala Glu Glu Ile Arg Ala Val Trp Ala Gly Arg Gly Arg Arg | | |
| | 1745 | 1750 | 1755 |
| | Thr Arg Arg Leu Arg Val Ser His Ala Phe His Ser Pro His Met Asp | | |
| | 1765 | 1770 | 1775 |
| | 40 Asp Val Leu Asp Glu Phe Leu Arg Val Ala Glu Gly Leu Thr Phe Glu | | |

| | 1780 | 1785 | 1790 |
|----|---|------|------|
| | Glu Pro Arg Ile Pro Val Val Ser Thr Val Thr Gly Ala Leu Val Thr | | |
| | 1795 | 1800 | 1805 |
| | Ser Gly Glu Leu Thr Ser Pro Ala Tyr Trp Val Asp Gln Ile Arg Arg | | |
| 5 | 1810 | 1815 | 1820 |
| | Pro Val Arg Phe Leu Asp Ala Val Arg Thr Leu Ala Ala Gln Asp Ala | | |
| | 1825 | 1830 | 1835 |
| | Thr Val Leu Val Glu Ile Gly Pro Asp Ala Val Leu Thr Ala Leu Ala | | |
| | 1845 | 1850 | 1855 |
| 10 | Glu Ala Leu Ala Pro Gly Thr Asp Ala Pro Asp Ala Arg Asp Val | | |
| | 1860 | 1865 | 1870 |
| | Thr Val Val Pro Leu Leu Arg Ala Gly Arg Pro Glu Pro Glu Thr Leu | | |
| | 1875 | 1880 | 1885 |
| | Ala Ala Gly Leu Ala Thr Ala His Val His Gly Ala Pro Leu Asp Arg | | |
| 15 | 1890 | 1895 | 1900 |
| | Ala Ser Phe Phe Pro Asp Gly Arg Arg Thr Asp Leu Pro Thr Tyr Ala | | |
| | 1905 | 1910 | 1915 |
| | Phe Arg Arg Glu His Tyr Trp Leu Thr Pro Glu Ala Arg Thr Asp Ala | | |
| | 1925 | 1930 | 1935 |
| 20 | Arg Ala Leu Gly Phe Asp Pro Ala Arg His Pro Leu Leu Thr Thr Thr | | |
| | 1940 | 1945 | 1950 |
| | Val Glu Val Ala Gly Gly Asp Gly Val Leu Leu Thr Gly Arg Leu Ser | | |
| | 1955 | 1960 | 1965 |
| | Leu Thr Asp Gln Pro Trp Leu Ala Asp His Met Val Asn Gly Ala Val | | |
| 25 | 1970 | 1975 | 1980 |
| | Leu Leu Pro Ala Thr Ala Phe Leu Glu Leu Ala Leu Ala Gly Asp | | |
| | 1985 | 1990 | 1995 |
| | His Val Gly Ala Val Arg Val Glu Glu Leu Thr Leu Glu Ala Pro Leu | | |
| | 2005 | 2010 | 2015 |
| 30 | Val Leu Pro Glu Arg Gly Ala Val Arg Ile Gln Val Gly Val Ser Gly | | |
| | 2020 | 2025 | 2030 |
| | Asp Gly Glu Ser Pro Ala Gly Arg Thr Phe Gly Val Tyr Ser Thr Pro | | |
| | 2035 | 2040 | 2045 |
| | Asp Ser Gly Asp Thr Gly Asp Asp Ala Pro Arg Glu Trp Thr Arg His | | |
| 35 | 2050 | 2055 | 2060 |
| | Val Ser Gly Val Leu Gly Glu Gly Asp Pro Ala Thr Glu Ser Asp His | | |
| | 2065 | 2070 | 2075 |
| | Pro Gly Thr Asp Gly Asp Gly Ser Ala Ala Trp Pro Pro Ala Ala Ala | | |
| | 2085 | 2090 | 2095 |
| 40 | Thr Ala Thr Pro Leu Asp Gly Val Tyr Asp Arg Leu Ala Glu Leu Gly | | |

| | | |
|---|------|-----------|
| 2100 | 2105 | 2110 |
| Tyr Gly Tyr Gly Pro Ala Phe Gln Gly Leu Thr Gly Leu Trp Arg Asp | | |
| 2115 | 2120 | 2125 |
| Gly Ala Asp Thr Leu Ala Glu Ile Arg Leu Pro Ala Ala Gln His Glu | | |
| 5 2130 | 2135 | 2140 |
| Ser Ala Gly Leu Phe Gly Val His Pro Ala Leu Leu Asp Ala Ala Leu | | |
| 2145 | 2150 | 2155 2160 |
| His Pro Ile Val Leu Glu Gly Asn Ser Ala Ala Gly Ala Cys Asp Ala | | |
| 2165 | 2170 | 2175 |
| 10Asp Thr Asp Ala Thr Asp Arg Ile Arg Leu Pro Phe Ala Trp Ala Gly | | |
| 2180 | 2185 | 2190 |
| Val Thr Leu His Ala Glu Gly Ala Thr Ala Leu Arg Val Arg Ile Thr | | |
| 2195 | 2200 | 2205 |
| Pro Thr Gly Pro Asp Thr Val Thr Leu Arg Leu Thr Asp Thr Thr Gly | | |
| 15 2210 | 2215 | 2220 |
| Ala Pro Val Ala Thr Val Glu Ser Leu Thr Leu Arg Ala Val Ala Lys | | |
| 2225 | 2230 | 2235 2240 |
| Asp Arg Leu Gly Thr Thr Ala Gly Arg Val Asp Asp Ala Leu Phe Thr | | |
| 2245 | 2250 | 2255 |
| 20Val Val Trp Thr Glu Thr Gly Thr Pro Glu Pro Ala Gly Arg Gly Ala | | |
| 2260 | 2265 | 2270 |
| Val Glu Val Glu Glu Leu Val Asp Leu Ala Gly Leu Gly Asp Leu Val | | |
| 2275 | 2280 | 2285 |
| Glu Leu Gly Ala Ala Asp Val Val Leu Arg Ala Asp Arg Trp Thr Leu | | |
| 25 2290 | 2295 | 2300 |
| Asp Gly Asp Pro Ser Ala Ala Ala Arg Thr Ala Val Arg Arg Thr Leu | | |
| 2305 | 2310 | 2315 2320 |
| Ala Ile Val Gln Glu Phe Leu Ser Glu Pro Arg Phe Asp Gly Ser Arg | | |
| 2325 | 2330 | 2335 |
| 30Leu Val Cys Val Thr Arg Gly Ala Val Ala Ala Leu Pro Gly Glu Asp | | |
| 2340 | 2345 | 2350 |
| Val Thr Ser Leu Ala Thr Gly Pro Leu Trp Gly Leu Val Arg Ser Ala | | |
| 2355 | 2360 | 2365 |
| Gln Ser Glu Asn Pro Gly Arg Leu Phe Leu Leu Asp Leu Gly Glu Gly | | |
| 35 2370 | 2375 | 2380 |
| Glu Gly Glu Arg Asp Gly Ala Glu Glu Leu Ile Arg Ala Ala Thr Ala | | |
| 2385 | 2390 | 2395 2400 |
| Gly Asp Glu Pro Gln Leu Ala Ala Arg Asp Gly Arg Leu Leu Ala Pro | | |
| 2405 | 2410 | 2415 |
| 40Arg Leu Ala Arg Thr Ala Ala Leu Ser Ser Glu Asp Thr Ala Gly Gly | | |

| | 5925 | 5930 | 5935 |
|---|------|------|------|
| Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala | | | |
| 5940 | 5945 | 5950 | |
| Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly | | | |
| 5 5955 | 5960 | 5965 | |
| Lys Gly Gly Met Ile Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln | | | |
| 5970 | 5975 | 5980 | |
| Arg Ile Glu Asn Leu His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro | | | |
| 5985 | 5990 | 5995 | 6000 |
| 10Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala | | | |
| 6005 | 6010 | 6015 | |
| Gln Ala Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro Val Asp | | | |
| 6020 | 6025 | 6030 | |
| Tyr Ala Ser His Ser Ala His Val Glu Thr Ile Glu Ser Glu Leu Ala | | | |
| 15 6035 | 6040 | 6045 | |
| Glu Val Leu Ala Gly Leu Ser Pro Arg Thr Pro Glu Val Pro Phe Phe | | | |
| 6050 | 6055 | 6060 | |
| Ser Thr Leu Glu Gly Ala Trp Ile Thr Glu Pro Val Leu Asp Gly Thr | | | |
| 6065 | 6070 | 6075 | 6080 |
| 20Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Val | | | |
| 6085 | 6090 | 6095 | |
| Glu Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser | | | |
| 6100 | 6105 | 6110 | |
| Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly Leu | | | |
| 25 6115 | 6120 | 6125 | |
| Gly Thr Leu Arg Arg Glu Gln Gly Gln Glu Arg Leu Val Thr Ser | | | |
| 6130 | 6135 | 6140 | |
| Leu Ala Glu Ala Trp Thr Asn Gly Leu Thr Ile Asp Trp Ala Pro Val | | | |
| 6145 | 6150 | 6155 | 6160 |
| 30Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr Tyr Ala Phe | | | |
| 6165 | 6170 | 6175 | |
| Gln Arg Arg His Tyr Trp Leu His Asp Ser Pro Ala Val Gln Gly Ser | | | |
| 6180 | 6185 | 6190 | |
| Val Gln Asp Ser Trp Arg Tyr Arg Ile Asp Trp Lys Arg Leu Ala Val | | | |
| 35 6195 | 6200 | 6205 | |
| Ala Asp Ala Ser Glu Arg Ala Gly Leu Ser Gly Arg Trp Leu Val Val | | | |
| 6210 | 6215 | 6220 | |
| Val Pro Glu Asp Arg Ser Ala Glu Ala Ala Pro Val Leu Ala Ala Leu | | | |
| 6225 | 6230 | 6235 | 6240 |
| 40Ser Gly Ala Gly Ala Asp Pro Val Gln Leu Asp Val Ser Pro Leu Gly | | | |

| | | | |
|---|------|------|------|
| | 6245 | 6250 | 6255 |
| Asp Arg Gln Arg Leu Ala Ala Thr Leu Gly Glu Ala Leu Ala Ala Ala | | | |
| 6260 | 6265 | 6270 | |
| Gly Gly Ala Val Asp Gly Val Leu Ser Leu Leu Ala Trp Asp Glu Ser | | | |
| 5 6275 | 6280 | 6285 | |
| Ala His Pro Gly His Pro Ala Pro Phe Thr Arg Gly Thr Gly Ala Thr | | | |
| 6290 | 6295 | 6300 | |
| Leu Thr Leu Val Gln Ala Leu Glu Asp Ala Gly Val Ala Ala Pro Leu | | | |
| 6305 | 6310 | 6315 | 6320 |
| 10Trp Cys Val Thr His Gly Ala Val Ser Val Gly Arg Ala Asp His Val | | | |
| 6325 | 6330 | 6335 | |
| Thr Ser Pro Ala Gln Ala Met Val Trp Gly Met Gly Arg Val Ala Ala | | | |
| 6340 | 6345 | 6350 | |
| Leu Glu His Pro Glu Arg Trp Gly Gly Leu Ile Asp Leu Pro Ser Asp | | | |
| 15 6355 | 6360 | 6365 | |
| Ala Asp Arg Ala Ala Leu Asp Arg Met Thr Thr Val Leu Ala Gly Gly | | | |
| 6370 | 6375 | 6380 | |
| Thr Gly Glu Asp Gln Val Ala Val Arg Ala Ser Gly Leu Leu Ala Arg | | | |
| 6385 | 6390 | 6395 | 6400 |
| 20Arg Leu Val Arg Ala Ser Leu Pro Ala His Gly Thr Ala Ser Pro Trp | | | |
| 6405 | 6410 | 6415 | |
| Trp Gln Ala Asp Gly Thr Val Leu Val Thr Gly Ala Glu Glu Pro Ala | | | |
| 6420 | 6425 | 6430 | |
| Ala Ala Glu Ala Ala Arg Arg Leu Ala Arg Asp Gly Ala Gly His Leu | | | |
| 25 6435 | 6440 | 6445 | |
| Leu Leu His Thr Thr Pro Ser Gly Ser Glu Gly Ala Glu Gly Thr Ser | | | |
| 6450 | 6455 | 6460 | |
| Gly Ala Ala Glu Asp Ser Gly Leu Ala Gly Leu Val Ala Glu Leu Ala | | | |
| 6465 | 6470 | 6475 | 6480 |
| 30Asp Leu Gly Ala Thr Ala Thr Val Val Thr Cys Asp Leu Thr Asp Ala | | | |
| 6485 | 6490 | 6495 | |
| Glu Ala Ala Ala Arg Leu Leu Ala Gly Val Ser Asp Ala His Pro Leu | | | |
| 6500 | 6505 | 6510 | |
| Ser Ala Val Leu His Leu Pro Pro Thr Val Asp Ser Glu Pro Leu Ala | | | |
| 35 6515 | 6520 | 6525 | |
| Ala Thr Asp Ala Asp Ala Leu Ala Arg Val Val Thr Ala Lys Ala Thr | | | |
| 6530 | 6535 | 6540 | |
| Ala Ala Leu His Leu Asp Arg Leu Leu Arg Glu Ala Ala Ala Ala Gly | | | |
| 6545 | 6550 | 6555 | 6560 |
| 40Gly Arg Pro Pro Val Leu Val Leu Phe Ser Ser Val Ala Ala Ile Trp | | | |

| | 6565 | 6570 | 6575 |
|----|---|------|------|
| | Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Gly Thr Ala Phe Leu Asp | | |
| | 6580 | 6585 | 6590 |
| | Ala Leu Ala Gly Gln His Arg Ala Asp Gly Pro Thr Val Thr Ser Val | | |
| 5 | 6595 | 6600 | 6605 |
| | Ala Trp Ser Pro Trp Glu Gly Ser Arg Val Thr Glu Gly Ala Thr Gly | | |
| | 6610 | 6615 | 6620 |
| | Glu Arg Leu Arg Arg Leu Gly Leu Arg Pro Leu Ala Pro Ala Thr Ala | | |
| | 6625 | 6630 | 6635 |
| | | | 6640 |
| | 10Leu Thr Ala Leu Asp Thr Ala Leu Gly His Gly Asp Thr Ala Val Thr | | |
| | 6645 | 6650 | 6655 |
| | Ile Ala Asp Val Asp Trp Ser Ser Phe Ala Pro Gly Phe Thr Thr Ala | | |
| | 6660 | 6665 | 6670 |
| | Arg Pro Gly Thr Leu Leu Ala Asp Leu Pro Glu Ala Arg Arg Ala Leu | | |
| 15 | 6675 | 6680 | 6685 |
| | Asp Glu Gln Gln Ser Thr Thr Ala Ala Asp Asp Thr Val Leu Ser Arg | | |
| | 6690 | 6695 | 6700 |
| | Glu Leu Gly Ala Leu Thr Gly Ala Glu Gln Gln Arg Arg Met Gln Glu | | |
| | 6705 | 6710 | 6715 |
| | | | 6720 |
| | 20Leu Val Arg Glu His Leu Ala Val Val Leu Asn His Pro Ser Pro Glu | | |
| | 6725 | 6730 | 6735 |
| | Ala Val Asp Thr Gly Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu | | |
| | 6740 | 6745 | 6750 |
| | Thr Ala Val Glu Leu Arg Asn Arg Leu Lys Asn Ala Thr Gly Leu Ala | | |
| 25 | 6755 | 6760 | 6765 |
| | Leu Pro Ala Thr Leu Val Phe Asp Tyr Pro Thr Pro Arg Thr Leu Ala | | |
| | 6770 | 6775 | 6780 |
| | Glu Phe Leu Leu Ala Glu Ile Leu Gly Glu Gln Ala Gly Ala Gly Glu | | |
| | 6785 | 6790 | 6795 |
| | | | 6800 |
| | 30Gln Leu Pro Val Asp Gly Gly Val Asp Asp Glu Pro Val Ala Ile Val | | |
| | 6805 | 6810 | 6815 |
| | Gly Met Ala Cys Arg Leu Pro Gly Gly Val Ala Ser Pro Glu Asp Leu | | |
| | 6820 | 6825 | 6830 |
| | Trp Arg Leu Val Ala Gly Gly Glu Asp Ala Ile Ser Gly Phe Pro Gln | | |
| 35 | 6835 | 6840 | 6845 |
| | Asp Arg Gly Trp Asp Val Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala | | |
| | 6850 | 6855 | 6860 |
| | Ser Gly Arg Thr Tyr Cys Arg Ala Gly Gly Phe Leu Asp Glu Ala Gly | | |
| | 6865 | 6870 | 6875 |
| | | | 6880 |
| | 40Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala | | |

| | | | |
|--|------|------|------|
| | 6885 | 6890 | 6895 |
| Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Val | | | |
| 6900 | 6905 | 6910 | |
| Glu Asp Ala Gly Ile Asp Pro Thr Ser Leu Gln Gly Gln Gln Val Gly | | | |
| 5 6915 | 6920 | 6925 | |
| Val Phe Ala Gly Thr Asn Gly Pro His Tyr Glu Pro Leu Leu Arg Asn | | | |
| 6930 | 6935 | 6940 | |
| Thr Ala Glu Asp Leu Glu Gly Tyr Val Gly Thr Gly Asn Ala Ala Ser | | | |
| 6945 | 6950 | 6955 | 6960 |
| 10 Ile Met Ser Gly Arg Val Ser Tyr Thr Leu Gly Leu Glu Gly Pro Ala | | | |
| 6965 | 6970 | 6975 | |
| Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu | | | |
| 6980 | 6985 | 6990 | |
| Ala Val Gln Ala Leu Arg Lys Gly Glu Cys Gly Leu Ala Leu Ala Gly | | | |
| 15 6995 | 7000 | 7005 | |
| Gly Val Thr Val Met Ser Thr Pro Thr Thr Phe Val Glu Phe Ser Arg | | | |
| 7010 | 7015 | 7020 | |
| Gln Arg Gly Leu Ala Glu Asp Gly Arg Ser Lys Ala Phe Ala Ala Ser | | | |
| 7025 | 7030 | 7035 | 7040 |
| 20 Ala Asp Gly Phe Gly Pro Ala Glu Gly Val Gly Met Leu Leu Val Glu | | | |
| 7045 | 7050 | 7055 | |
| Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val | | | |
| 7060 | 7065 | 7070 | |
| Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala | | | |
| 25 7075 | 7080 | 7085 | |
| Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp | | | |
| 7090 | 7095 | 7100 | |
| Ala Arg Leu Thr Thr Ala Asp Val Asp Val Val Glu Ala His Gly Thr | | | |
| 7105 | 7110 | 7115 | 7120 |
| 30 Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr | | | |
| 7125 | 7130 | 7135 | |
| Tyr Gly Gln Gly Arg Asp Thr Glu Gln Pro Leu Arg Leu Gly Ser Leu | | | |
| 7140 | 7145 | 7150 | |
| Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ser Gly Ile | | | |
| 35 7155 | 7160 | 7165 | |
| Ile Lys Met Val Gln Ala Met Arg His Gly Val Leu Pro Lys Thr Leu | | | |
| 7170 | 7175 | 7180 | |
| His Val Asp Arg Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val | | | |
| 7185 | 7190 | 7195 | 7200 |
| 40 Glu Leu Leu Thr Glu Ala Met Asp Trp Pro Arg Lys Gln Glu Gly Gly | | | |

| | | | |
|--|------|------|------|
| | 7205 | 7210 | 7215 |
| Leu Arg Arg Ala Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala | | | |
| 7220 | 7225 | 7230 | |
| His Ile Val Leu Glu Glu Ala Pro Val Asp Glu Asp Ala Pro Ala Asp | | | |
| 5 7235 | 7240 | 7245 | |
| Glu Pro Ser Val Gly Gly Val Val Pro Trp Leu Val Ser Ala Lys Thr | | | |
| 7250 | 7255 | 7260 | |
| Pro Ala Ala Leu Asp Ala Gln Ile Gly Arg Leu Ala Ala Phe Ala Ser | | | |
| 7265 | 7270 | 7275 | 7280 |
| 10 Gln Gly Arg Thr Asp Ala Ala Asp Pro Gly Ala Val Ala Arg Val Leu | | | |
| 7285 | 7290 | 7295 | |
| Ala Gly Gly Arg Ala Gln Phe Glu His Arg Ala Val Ala Leu Gly Thr | | | |
| 7300 | 7305 | 7310 | |
| Gly Gln Asp Asp Leu Ala Ala Leu Ala Ala Pro Glu Gly Leu Val | | | |
| 15 7315 | 7320 | 7325 | |
| Arg Gly Val Ala Ser Gly Val Gly Arg Val Ala Phe Val Phe Pro Gly | | | |
| 7330 | 7335 | 7340 | |
| Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp Val Ser | | | |
| 7345 | 7350 | 7355 | 7360 |
| 20 Lys Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Ala Ala Leu Ala Pro | | | |
| 7365 | 7370 | 7375 | |
| Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro Gly Ala | | | |
| 7380 | 7385 | 7390 | |
| Pro Thr Leu Glu Arg Val Asp Val Val Gln Pro Val Thr Phe Ala Val | | | |
| 25 7395 | 7400 | 7405 | |
| Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Val Thr Pro Gln | | | |
| 7410 | 7415 | 7420 | |
| Ala Val Val Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala | | | |
| 7425 | 7430 | 7435 | 7440 |
| 30 Gly Ala Leu Ser Leu Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser | | | |
| 7445 | 7450 | 7455 | |
| Lys Ser Ile Gly Ala His Leu Ala Gly Gln Gly Gly Met Leu Ser Leu | | | |
| 7460 | 7465 | 7470 | |
| Ala Leu Ser Glu Ala Ala Val Val Glu Arg Leu Ala Gly Phe Asp Gly | | | |
| 35 7475 | 7480 | 7485 | |
| Leu Ser Val Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly | | | |
| 7490 | 7495 | 7500 | |
| Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala Asp Gly | | | |
| 7505 | 7510 | 7515 | 7520 |
| 40 Val Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser Ala His | | | |

| | | | |
|--|------|------|------|
| | 7525 | 7530 | 7535 |
| Val Glu Thr Ile Glu Ser Glu Leu Ala Asp Val Leu Ala Gly Leu Ser | | | |
| | 7540 | 7545 | 7550 |
| Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly Ala Trp | | | |
| 5 | 7555 | 7560 | 7565 |
| Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn Leu Arg | | | |
| | 7570 | 7575 | 7580 |
| His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr Asp Glu | | | |
| | 7585 | 7590 | 7595 |
| 10 Gly Phe Thr His Phe Val Glu Val Ser Ala His Pro Val Leu Thr Met | | | |
| | 7605 | 7610 | 7615 |
| Ala Leu Pro Glu Thr Val Thr Gly Leu Gly Thr Leu Arg Arg Asp Asn | | | |
| | 7620 | 7625 | 7630 |
| Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp Ala Asn | | | |
| 15 | 7635 | 7640 | 7645 |
| Gly Leu Thr Val Asp Trp Ala Ser Leu Leu Pro Thr Thr Thr His | | | |
| | 7650 | 7655 | 7660 |
| Pro Asp Leu Pro Thr Tyr Ala Phe Gln Thr Glu Arg Tyr Trp Pro Gln | | | |
| | 7665 | 7670 | 7675 |
| 20 Pro Asp Leu Ser Ala Ala Gly Asp Ile Thr Ser Ala Gly Leu Gly Ala | | | |
| | 7685 | 7690 | 7695 |
| Ala Glu His Pro Leu Leu Gly Ala Ala Val Ala Leu Ala Asp Ser Asp | | | |
| | 7700 | 7705 | 7710 |
| Gly Cys Leu Leu Thr Gly Ser Leu Ser Leu Arg Thr His Pro Trp Leu | | | |
| 25 | 7715 | 7720 | 7725 |
| Ala Asp His Ala Val Ala Gly Thr Val Leu Leu Pro Gly Thr Ala Phe | | | |
| | 7730 | 7735 | 7740 |
| Val Glu Leu Ala Phe Arg Ala Gly Asp Gln Val Gly Cys Asp Leu Val | | | |
| | 7745 | 7750 | 7755 |
| 30 Glu Glu Leu Thr Leu Asp Ala Pro Leu Val Leu Pro Arg Arg Gly Ala | | | |
| | 7765 | 7770 | 7775 |
| Val Arg Val Gln Leu Ser Val Gly Ala Ser Asp Glu Ser Gly Arg Arg | | | |
| | 7780 | 7785 | 7790 |
| Thr Phe Gly Leu Tyr Ala His Pro Glu Asp Ala Pro Gly Glu Ala Glu | | | |
| 35 | 7795 | 7800 | 7805 |
| Trp Thr Arg His Ala Thr Gly Val Leu Ala Ala Arg Ala Asp Arg Thr | | | |
| | 7810 | 7815 | 7820 |
| Ala Pro Val Ala Asp Pro Glu Ala Trp Pro Pro Pro Gly Ala Glu Pro | | | |
| | 7825 | 7830 | 7835 |
| 40 Val Asp Val Asp Gly Leu Tyr Glu Arg Phe Ala Ala Asn Gly Tyr Gly | | | |

| | | | |
|--|------|------|------|
| | 7845 | 7850 | 7855 |
| Tyr Gly Pro Leu Phe Gln Gly Val Arg Gly Val Trp Arg Arg Gly Asp | | | |
| | 7860 | 7865 | 7870 |
| Glu Val Phe Ala Asp Val Ala Leu Pro Ala Glu Val Ala Gly Ala Glu | | | |
| 5 | 7875 | 7880 | 7885 |
| Gly Ala Arg Phe Gly Leu His Pro Ala Leu Leu Asp Ala Ala Val Gln | | | |
| | 7890 | 7895 | 7900 |
| Ala Ala Gly Ala Gly Arg Gly Val Arg Arg Gly His Ala Ala Ala Val | | | |
| 7905 | 7910 | 7915 | 7920 |
| 10 Arg Leu Glu Arg Asp Leu Leu Tyr Ala Val Gly Ala Thr Ala Leu Arg | | | |
| | 7925 | 7930 | 7935 |
| Val Arg Leu Ala Pro Ala Gly Pro Asp Thr Val Ser Val Ser Ala Ala | | | |
| | 7940 | 7945 | 7950 |
| Asp Ser Ser Gly Gln Pro Val Phe Ala Ala Asp Ser Leu Thr Val Leu | | | |
| 15 | 7955 | 7960 | 7965 |
| Pro Val Asp Pro Ala Gln Leu Ala Ala Phe Ser Asp Pro Thr Leu Asp | | | |
| | 7970 | 7975 | 7980 |
| Ala Leu His Leu Leu Glu Trp Thr Ala Trp Asp Gly Ala Ala Gln Ala | | | |
| 7985 | 7990 | 7995 | 8000 |
| 20 Leu Pro Gly Ala Val Val Leu Gly Asp Ala Asp Gly Leu Ala Ala | | | |
| | 8005 | 8010 | 8015 |
| Ala Leu Arg Ala Gly Gly Thr Glu Val Leu Ser Phe Pro Asp Leu Thr | | | |
| | 8020 | 8025 | 8030 |
| Asp Leu Val Glu Ala Val Asp Arg Gly Glu Thr Pro Ala Pro Ala Thr | | | |
| 25 | 8035 | 8040 | 8045 |
| Val Leu Val Ala Cys Pro Ala Ala Gly Pro Asp Gly Pro Glu His Val | | | |
| | 8050 | 8055 | 8060 |
| Arg Glu Ala Leu His Gly Ser Leu Ala Leu Met Gln Ala Trp Leu Ala | | | |
| 8065 | 8070 | 8075 | 8080 |
| 30 Asp Glu Arg Phe Thr Asp Gly Arg Leu Val Leu Val Thr Arg Asp Ala | | | |
| | 8085 | 8090 | 8095 |
| Val Ala Ala Arg Ser Gly Asp Gly Leu Arg Ser Thr Gly Gln Ala Ala | | | |
| | 8100 | 8105 | 8110 |
| Val Trp Gly Leu Gly Arg Ser Ala Gln Thr Glu Ser Pro Gly Arg Phe | | | |
| 35 | 8115 | 8120 | 8125 |
| Val Leu Leu Asp Leu Ala Gly Glu Ala Arg Thr Ala Gly Asp Ala Thr | | | |
| | 8130 | 8135 | 8140 |
| Ala Gly Asp Gly Leu Thr Thr Gly Asp Ala Thr Val Gly Gly Thr Ser | | | |
| 8145 | 8150 | 8155 | 8160 |
| 40 Gly Asp Ala Ala Leu Gly Ser Ala Leu Ala Thr Ala Leu Gly Ser Gly | | | |

| | | |
|---|------|------|
| 8165 | 8170 | 8175 |
| Glu Pro Gln Leu Ala Leu Arg Asp Gly Ala Leu Leu Val Pro Arg Leu | | |
| 8180 | 8185 | 8190 |
| Ala Arg Ala Ala Ala Pro Ala Ala Asp Gly Leu Ala Ala Ala Asp | | |
| 5 8195 | 8200 | 8205 |
| Gly Leu Ala Ala Leu Pro Leu Pro Ala Ala Pro Ala Leu Trp Arg Leu | | |
| 8210 | 8215 | 8220 |
| Glu Pro Gly Thr Asp Gly Ser Leu Glu Ser Leu Thr Ala Ala Pro Gly | | |
| 8225 | 8230 | 8235 |
| 10Asp Ala Glu Thr Leu Ala Pro Glu Pro Leu Gly Pro Gly Gln Val Arg | | |
| 8245 | 8250 | 8255 |
| Ile Ala Ile Arg Ala Thr Gly Leu Asn Phe Arg Asp Val Leu Ile Ala | | |
| 8260 | 8265 | 8270 |
| Leu Gly Met Tyr Pro Asp Pro Ala Leu Met Gly Thr Glu Gly Ala Gly | | |
| 15 8275 | 8280 | 8285 |
| Val Val Thr Ala Thr Gly Pro Gly Val Thr His Leu Ala Pro Gly Asp | | |
| 8290 | 8295 | 8300 |
| Arg Val Met Gly Leu Leu Ser Gly Ala Tyr Ala Pro Val Val Val Ala | | |
| 8305 | 8310 | 8315 |
| 20Asp Ala Arg Thr Val Ala Arg Met Pro Glu Gly Trp Thr Phe Ala Gln | | |
| 8325 | 8330 | 8335 |
| Gly Ala Ser Val Pro Val Val Phe Leu Thr Ala Val Tyr Ala Leu Arg | | |
| 8340 | 8345 | 8350 |
| Asp Leu Ala Asp Val Lys Pro Gly Glu Arg Leu Leu Val His Ser Ala | | |
| 25 8355 | 8360 | 8365 |
| Ala Gly Gly Val Gly Met Ala Ala Val Gln Leu Ala Arg His Trp Gly | | |
| 8370 | 8375 | 8380 |
| Val Glu Val His Gly Thr Ala Ser His Gly Lys Trp Asp Ala Leu Arg | | |
| 8385 | 8390 | 8395 |
| 30Ala Leu Gly Leu Asp Asp Ala His Ile Ala Ser Ser Arg Thr Leu Asp | | |
| 8405 | 8410 | 8415 |
| Phe Glu Ser Ala Phe Arg Ala Ala Ser Gly Gly Ala Gly Met Asp Val | | |
| 8420 | 8425 | 8430 |
| Val Leu Asn Ser Leu Ala Arg Glu Phe Val Asp Ala Ser Leu Arg Leu | | |
| 35 8435 | 8440 | 8445 |
| Leu Gly Pro Gly Gly Arg Phe Val Glu Met Gly Lys Thr Asp Val Arg | | |
| 8450 | 8455 | 8460 |
| Asp Ala Glu Arg Val Ala Ala Asp His Pro Gly Val Gly Tyr Arg Ala | | |
| 8465 | 8470 | 8475 |
| 40Phe Asp Leu Gly Glu Ala Gly Pro Glu Arg Ile Gly Glu Met Leu Ala | | |

| | | | |
|---|------|------|------|
| | 8485 | 8490 | 8495 |
| Glu Val Ile Ala Leu Phe Glu Asp Gly Val Leu Arg His Leu Pro Val | | | |
| | 8500 | 8505 | 8510 |
| Thr Thr Trp Asp Val Arg Arg Ala Arg Asp Ala Phe Arg His Val Ser | | | |
| 5 | 8515 | 8520 | 8525 |
| Gln Ala Arg His Thr Gly Lys Val Val Leu Thr Met Pro Ser Gly Leu | | | |
| | 8530 | 8535 | 8540 |
| Asp Pro Glu Gly Thr Val Leu Leu Thr Gly Gly Thr Gly Ala Leu Gly | | | |
| | 8545 | 8550 | 8555 |
| 10Gly Ile Val Ala Arg His Val Val Gly Glu Trp Gly Val Arg Arg Leu | | | |
| | 8565 | 8570 | 8575 |
| Leu Leu Val Ser Arg Arg Gly Thr Asp Ala Pro Gly Ala Gly Glu Leu | | | |
| | 8580 | 8585 | 8590 |
| Val His Glu Leu Glu Ala Leu Gly Ala Asp Val Ser Val Ala Ala Cys | | | |
| 15 | 8595 | 8600 | 8605 |
| Asp Val Ala Asp Arg Glu Ala Leu Thr Ala Val Leu Asp Ser Ile Pro | | | |
| | 8610 | 8615 | 8620 |
| Ala Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val Leu Ser | | | |
| | 8625 | 8630 | 8635 |
| 15Asp Gly Thr Leu Pro Ser Met Thr Ala Glu Asp Val Glu His Val Leu | | | |
| | 8645 | 8650 | 8655 |
| Arg Pro Lys Val Asp Ala Ala Phe Leu Leu Asp Glu Leu Thr Ser Thr | | | |
| | 8660 | 8665 | 8670 |
| Pro Gly Tyr Asp Leu Ala Ala Phe Val Met Phe Ser Ser Ala Ala Ala | | | |
| 25 | 8675 | 8680 | 8685 |
| Val Phe Gly Gly Ala Gly Gln Gly Ala Tyr Ala Ala Asn Ala Thr | | | |
| | 8690 | 8695 | 8700 |
| Leu Asp Ala Leu Ala Trp Arg Arg Arg Thr Ala Gly Leu Pro Ala Leu | | | |
| | 8705 | 8710 | 8715 |
| 30Ser Leu Gly Trp Gly Leu Trp Ala Glu Thr Ser Gly Met Thr Gly Gly | | | |
| | 8725 | 8730 | 8735 |
| Leu Ser Asp Thr Asp Arg Ser Arg Leu Ala Arg Ser Gly Ala Thr Pro | | | |
| | 8740 | 8745 | 8750 |
| Met Asp Ser Glu Leu Thr Leu Ser Leu Leu Asp Ala Ala Met Arg Arg | | | |
| 35 | 8755 | 8760 | 8765 |
| Asp Asp Pro Ala Leu Val Pro Ile Ala Leu Asp Val Ala Ala Leu Arg | | | |
| | 8770 | 8775 | 8780 |
| Ala Gln Gln Arg Asp Gly Met Leu Ala Pro Leu Leu Ser Gly Leu Thr | | | |
| | 8785 | 8790 | 8795 |
| 40Arg Gly Ser Arg Val Gly Gly Ala Pro Val Asn Gln Arg Arg Ala Ala | | | |

| | | | |
|---|------|------|------|
| | 8805 | 8810 | 8815 |
| Ala Gly Gly Ala Gly Glu Ala Asp Thr Asp Leu Gly Gly Arg Leu Ala | | | |
| | 8820 | 8825 | 8830 |
| Ala Met Thr Pro Asp Asp Arg Val Ala His Leu Arg Asp Leu Val Arg | | | |
| 5 | 8835 | 8840 | 8845 |
| Thr His Val Ala Thr Val Leu Gly His Gly Thr Pro Ser Arg Val Asp | | | |
| | 8850 | 8855 | 8860 |
| Leu Glu Arg Ala Phe Arg Asp Thr Gly Phe Asp Ser Leu Thr Ala Val | | | |
| | 8865 | 8870 | 8875 |
| 10Glu Leu Arg Asn Arg Leu Asn Ala Ala Thr Gly Leu Arg Leu Pro Ala | | | |
| | 8885 | 8890 | 8895 |
| Thr Leu Val Phe Asp His Pro Thr Pro Gly Glu Leu Ala Gly His Leu | | | |
| | 8900 | 8905 | 8910 |
| Leu Asp Glu Leu Ala Thr Ala Ala Gly Gly Ser Trp Ala Glu Gly Thr | | | |
| 15 | 8915 | 8920 | 8925 |
| Gly Ser Gly Asp Thr Ala Ser Ala Thr Asp Arg Gln Thr Thr Ala Ala | | | |
| | 8930 | 8935 | 8940 |
| Leu Ala Glu Leu Asp Arg Leu Glu Gly Val Leu Ala Ser Leu Ala Pro | | | |
| | 8945 | 8950 | 8955 |
| 20Ala Ala Gly Gly Arg Pro Glu Leu Ala Ala Arg Leu Arg Ala Leu Ala | | | |
| | 8965 | 8970 | 8975 |
| Ala Ala Leu Gly Asp Asp Gly Asp Asp Ala Thr Asp Leu Asp Glu Ala | | | |
| | 8980 | 8985 | 8990 |
| Ser Asp Asp Asp Leu Phe Ser Phe Ile Asp Lys Glu Leu Gly Asp Ser | | | |
| 25 | 8995 | 9000 | 9005 |
| Asp Phe Met Ala Asn Asn Glu Asp Lys Leu Arg Asp Tyr Leu Lys Arg | | | |
| | 9010 | 9015 | 9020 |
| Val Thr Ala Glu Leu Gln Gln Asn Thr Arg Arg Leu Arg Glu Ile Glu | | | |
| | 9025 | 9030 | 9035 |
| 30Gly Arg Thr His Glu Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu | | | |
| | 9045 | 9050 | 9055 |
| Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp Gln Leu Val Ala Gly | | | |
| | 9060 | 9065 | 9070 |
| Asp Gly Asp Ala Ile Ser Glu Phe Pro Gln Asp Arg Gly Trp Asp Val | | | |
| 35 | 9075 | 9080 | 9085 |
| Glu Gly Leu Tyr Asp Pro Asp Pro Asp Ala Ser Gly Arg Thr Tyr Cys | | | |
| | 9090 | 9095 | 9100 |
| Arg Ser Gly Gly Phe Leu His Asp Ala Gly Glu Phe Asp Ala Asp Phe | | | |
| | 9105 | 9110 | 9115 |
| 40Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg | | | |

| | | | |
|--|------|------|------|
| | 9125 | 9130 | 9135 |
| Leu Ser Leu Thr Thr Ala Trp Glu Ala Ile Glu Ser Ala Gly Ile Asp | | | |
| | 9140 | 9145 | 9150 |
| Pro Thr Ala Leu Lys Gly Ser Gly Leu Gly Val Phe Val Gly Gly Trp | | | |
| 5 | 9155 | 9160 | 9165 |
| His Thr Gly Tyr Thr Ser Gly Gln Thr Thr Ala Val Gln Ser Pro Glu | | | |
| | 9170 | 9175 | 9180 |
| Leu Glu Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly | | | |
| 9185 | 9190 | 9195 | 9200 |
| 10 Arg Ile Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp | | | |
| | 9205 | 9210 | 9215 |
| Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala | | | |
| | 9220 | 9225 | 9230 |
| Leu Arg Lys Gly Glu Cys Asp Met Ala Leu Ala Gly Gly Val Thr Val | | | |
| 15 | 9235 | 9240 | 9245 |
| Met Pro Asn Ala Asp Leu Phe Val Gln Phe Ser Arg Gln Arg Gly Leu | | | |
| | 9250 | 9255 | 9260 |
| Ala Ala Asp Gly Arg Ser Lys Ala Phe Ala Thr Ser Ala Asp Gly Phe | | | |
| 9265 | 9270 | 9275 | 9280 |
| 20 Gly Pro Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp | | | |
| | 9285 | 9290 | 9295 |
| Ala Arg Arg Asn Gly His Arg Ile Leu Ala Val Val Arg Gly Ser Ala | | | |
| | 9300 | 9305 | 9310 |
| Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro | | | |
| 25 | 9315 | 9320 | 9325 |
| Ser Gln Gln Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Ala | | | |
| | 9330 | 9335 | 9340 |
| Pro Gly Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu | | | |
| | 9345 | 9350 | 9355 |
| 30 Gly Asp Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Glu | | | |
| | 9365 | 9370 | 9375 |
| Lys Ser Ser Glu Gln Pro Leu Arg Leu Gly Ala Leu Lys Ser Asn Ile | | | |
| | 9380 | 9385 | 9390 |
| Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val | | | |
| 35 | 9395 | 9400 | 9405 |
| Gln Ala Met Arg His Gly Leu Leu Pro Lys Thr Leu His Val Asp Glu | | | |
| | 9410 | 9415 | 9420 |
| Pro Ser Asp Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr | | | |
| 9425 | 9430 | 9435 | 9440 |
| 40 Glu Ala Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala | | | |

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|---|------|------|
| 9445 | 9450 | 9455 |
| Ala Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu | | |
| 9460 | 9465 | 9470 |
| Glu Glu Ala Pro Ala Val Glu Asp Ser Pro Ala Val Glu Pro Pro Ala | | |
| 5 | 9475 | 9480 |
| Gly Gly Gly Val Val Pro Trp Pro Val Ser Ala Lys Thr Pro Ala Ala | | |
| 9490 | 9495 | 9500 |
| Leu Asp Ala Gln Ile Gly Gln Leu Ala Ala Tyr Ala Asp Gly Arg Thr | | |
| 9505 | 9510 | 9515 |
| 10Asp Val Asp Pro Ala Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr | | |
| 9525 | 9530 | 9535 |
| Ala Met Glu His Arg Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu | | |
| 9540 | 9545 | 9550 |
| Arg Asp Ala Leu Arg Met Pro Glu Gly Leu Val Arg Gly Thr Ser Ser | | |
| 15 | 9555 | 9560 |
| Asp Val Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp | | |
| 9570 | 9575 | 9580 |
| Ala Gly Met Gly Ala Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala | | |
| 9585 | 9590 | 9595 |
| 20Ser Met Ala Glu Cys Glu Thr Ala Leu Ser Arg Tyr Val Asp Trp Ser | | |
| 9605 | 9610 | 9615 |
| Leu Glu Ala Val Val Arg Gln Glu Pro Gly Ala Pro Thr Leu Asp Arg | | |
| 9620 | 9625 | 9630 |
| Val Asp Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala | | |
| 25 | 9635 | 9640 |
| Lys Val Trp Gln His His Gly Ile Thr Pro Gln Ala Val Val Gly His | | |
| 9650 | 9655 | 9660 |
| Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu | | |
| 9665 | 9670 | 9675 |
| 30Asp Asp Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala | | |
| 9685 | 9690 | 9695 |
| His Leu Ala Gly Lys Gly Met Ile Ser Leu Ala Leu Asp Glu Ala | | |
| 9700 | 9705 | 9710 |
| Ala Val Leu Lys Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala | | |
| 35 | 9715 | 9720 |
| Val Asn Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile | | |
| 9730 | 9735 | 9740 |
| Glu Glu Leu Ala Arg Thr Cys Glu Ala Asp Gly Val Arg Ala Arg Ile | | |
| 9745 | 9750 | 9755 |
| 40Ile Pro Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu | | |

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|---|-------|-------|-------|
| | 9765 | 9770 | 9775 |
| Lys Glu Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His | | | |
| | 9780 | 9785 | 9790 |
| Val Pro Phe Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val | | | |
| 5 | 9795 | 9800 | 9805 |
| Leu Asp Gly Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe | | | |
| | 9810 | 9815 | 9820 |
| Ala Pro Ala Val Glu Thr Leu Ala Val Asp Gly Phe Thr His Phe Ile | | | |
| | 9825 | 9830 | 9835 |
| 10Glu Val Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val | | | |
| | 9845 | 9850 | 9855 |
| Thr Gly Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu | | | |
| | 9860 | 9865 | 9870 |
| Val Thr Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp | | | |
| 15 | 9875 | 9880 | 9885 |
| Ala Pro Ile Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr | | | |
| | 9890 | 9895 | 9900 |
| Tyr Ala Phe Gln Thr Glu Arg Phe Trp Leu Gln Ser Ser Ala Pro Thr | | | |
| | 9905 | 9910 | 9915 |
| 20Ser Ala Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr | | | |
| | 9925 | 9930 | 9935 |
| Ala Ser Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly | | | |
| | 9940 | 9945 | 9950 |
| Ser Glu Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala | | | |
| 25 | 9955 | 9960 | 9965 |
| Glu Val Asp Val Leu Glu Ala Gly Ala Asp Asp Asp Arg Glu Ala Leu | | | |
| | 9970 | 9975 | 9980 |
| Ala Ala Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val | | | |
| | 9985 | 9990 | 9995 |
| 30Val Ser Leu Leu Asp Asp Leu Val Pro Gln Val Ala Trp Val Gln Ala | | | |
| | 10005 | 10010 | 10015 |
| Leu Gly Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr Gln Gly | | | |
| | 10020 | 10025 | 10030 |
| Ala Val Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala | | | |
| 35 | 10035 | 10040 | 10045 |
| Met Leu Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg | | | |
| | 10050 | 10055 | 10060 |
| Trp Ala Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Leu | | | |
| | 10065 | 10070 | 10075 |
| 40Ala His Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp Gln Ile | | | |
| | | | 10080 |

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|---|-------|-------|-------|
| | 10085 | 10090 | 10095 |
| Ala Ile Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg Ala Pro | | | |
| 10100 | 10105 | 10110 | |
| Leu His Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly Thr Val | | | |
| 5 10115 | 10120 | 10125 | |
| Leu Ile Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala Arg Trp | | | |
| 10130 | 10135 | 10140 | 1 |
| Met Ala His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly | | | |
| 0145 | 10150 | 10155 | 10160 |
| 10Glu Gln Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser | | | |
| 10165 | 10170 | 10175 | |
| Gly Ala Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro His Ala | | | |
| 10180 | 10185 | 10190 | |
| Met Arg Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala | | | |
| 15 10195 | 10200 | 10205 | |
| Val Val His Thr Ala Gly Ala Pro Gly Gly Asp Pro Leu Asp Val Thr | | | |
| 10210 | 10215 | 10220 | 1 |
| Gly Pro Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala | | | |
| 0225 | 10230 | 10235 | 10240 |
| 20Glu Val Leu Asp Asp Leu Leu Arg Gly Thr Pro Leu Asp Ala Phe Val | | | |
| 10245 | 10250 | 10255 | |
| Leu Tyr Ser Ser Asn Ala Gly Val Trp Gly Ser Gly Ser Gln Gly Val | | | |
| 10260 | 10265 | 10270 | |
| Tyr Ala Ala Ala Asn Ala His Leu Asp Ala Leu Ala Ala Arg Arg Arg | | | |
| 25 10275 | 10280 | 10285 | |
| Ala Arg Gly Glu Thr Ala Thr Ser Val Ala Trp Gly Leu Trp Ala Gly | | | |
| 10290 | 10295 | 10300 | 1 |
| Asp Gly Met Gly Arg Gly Ala Asp Asp Ala Tyr Trp Gln Arg Arg Gly | | | |
| 0305 | 10310 | 10315 | 10320 |
| 30Ile Arg Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala | | | |
| 10325 | 10330 | 10335 | |
| Leu Ser His Asp Glu Thr Phe Val Ala Val Ala Asp Val Asp Trp Glu | | | |
| 10340 | 10345 | 10350 | |
| Arg Phe Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Leu Asp | | | |
| 35 10355 | 10360 | 10365 | |
| Gly Val Pro Glu Ala Arg Gln Ala Leu Ala Ala Pro Val Gly Ala Pro | | | |
| 10370 | 10375 | 10380 | 1 |
| Ala Pro Gly Asp Ala Ala Val Ala Pro Thr Gly Gln Ser Ser Ala Leu | | | |
| 0385 | 10390 | 10395 | 10400 |
| 40Ala Ala Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu | | | |

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|--|-------|-------|-------|
| | 10405 | 10410 | 10415 |
| Thr Leu Val Arg Thr His Ala Ala Ala Val Leu Gly His Ser Ser Pro | | | |
| | 10420 | 10425 | 10430 |
| Asp Arg Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser | | | |
| 5 | 10435 | 10440 | 10445 |
| Leu Thr Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn | | | |
| | 10450 | 10455 | 10460 |
| Arg Leu Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu | | | |
| 0465 | 10470 | 10475 | 10480 |
| 10 Ala Ala His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro | | | |
| | 10485 | 10490 | 10495 |
| Thr Asp Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu | | | |
| | 10500 | 10505 | 10510 |
| Asp Arg Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr | | | |
| 15 | 10515 | 10520 | 10525 |
| Gly Ile Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala | | | |
| | 10530 | 10535 | 10540 |
| Asp Pro Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu | | | |
| 0545 | 10550 | 10555 | 10560 |
| 20 Ala Leu Ile Arg Met Ala Leu Gly Pro Arg Asn Thr Met Thr Ser Ser | | | |
| | 10565 | 10570 | 10575 |
| Asn Glu Gln Leu Val Asp Ala Leu Arg Ala Ser Leu Lys Glu Asn Glu | | | |
| | 10580 | 10585 | 10590 |
| Glu Leu Arg Lys Glu Ser Arg Arg Arg Ala Asp Arg Arg Gln Glu Pro | | | |
| 25 | 10595 | 10600 | 10605 |
| Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly Ile Arg Ser | | | |
| | 10610 | 10615 | 10620 |
| Pro Glu Asp Leu Trp Asp Ala Val Ala Gly Lys Asp Leu Val Ser | | | |
| 0625 | 10630 | 10635 | 10640 |
| 30 Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser Leu Tyr Asp Pro | | | |
| | 10645 | 10650 | 10655 |
| Val Pro Gly Arg Lys Gly Thr Tyr Val Arg Asn Ala Ala Phe Leu | | | |
| | 10660 | 10665 | 10670 |
| Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly Ile Ser Pro Arg | | | |
| 35 | 10675 | 10680 | 10685 |
| Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Gln Leu Leu Glu Ala Ser | | | |
| | 10690 | 10695 | 10700 |
| Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala Ser Val Arg Gly | | | |
| 0705 | 10710 | 10715 | 10720 |
| 40 Thr Asp Val Gly Val Tyr Val Gly Cys Gly Tyr Gln Asp Tyr Ala Pro | | | |

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|--|-------|-------|-------|
| | 10725 | 10730 | 10735 |
| Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr Val Val Thr Gly | | | |
| | 10740 | 10745 | 10750 |
| Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr Ser Leu Gly Leu | | | |
| 5 | 10755 | 10760 | 10765 |
| Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val | | | |
| | 10770 | 10775 | 10780 |
| Ala Leu His Leu Ala Leu Lys Gly Leu Arg Asn Gly Asp Cys Ser Thr | | | |
| 0785 | 10790 | 10795 | 10800 |
| 10 Ala Leu Val Gly Gly Val Ala Val Leu Ala Thr Pro Gly Ala Phe Ile | | | |
| | 10805 | 10810 | 10815 |
| Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly Arg Thr Lys Gly | | | |
| | 10820 | 10825 | 10830 |
| Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu Gly Val Ala Val | | | |
| 15 | 10835 | 10840 | 10845 |
| Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys Gly His Arg Val | | | |
| | 10850 | 10855 | 10860 |
| Leu Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp Gly Ala Ser Asn | | | |
| 0865 | 10870 | 10875 | 10880 |
| 20 Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His Leu Ile Arg Gln | | | |
| | 10885 | 10890 | 10895 |
| Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val Asp Val Val Glu | | | |
| | 10900 | 10905 | 10910 |
| Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala | | | |
| 25 | 10915 | 10920 | 10925 |
| Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly Gln Pro Leu Arg | | | |
| | 10930 | 10935 | 10940 |
| Leu Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ser Gly | | | |
| 0945 | 10950 | 10955 | 10960 |
| 30 Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg His Gly Val Leu | | | |
| | 10965 | 10970 | 10975 |
| Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln Val Asp Trp Ser | | | |
| | 10980 | 10985 | 10990 |
| Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp Trp Pro Glu Arg | | | |
| 35 | 10995 | 11000 | 11005 |
| Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe Gly Val Gly Gly | | | |
| | 11010 | 11015 | 11020 |
| Thr Asn Ala His Val Val Leu Glu Ala Pro Ala Val Glu Glu Ser | | | |
| 1025 | 11030 | 11035 | 11040 |
| 40 Pro Ala Val Glu Pro Pro Ala Gly Gly Val Val Pro Trp Pro Val | | | |

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|---|-------|-------|-------|
| | 11045 | 11050 | 11055 |
| Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile Gly Gln Leu Ala | | | |
| | 11060 | 11065 | 11070 |
| Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala Val Ala Ala Arg | | | |
| 5 | 11075 | 11080 | 11085 |
| Ala Leu Val Asp Ser Arg Thr Ala Met Glu His Arg Ala Val Ala Val | | | |
| | 11090 | 11095 | 11100 |
| 11105 Gly Asp Ser Arg Glu Ala Leu Arg Asp Ala Leu Arg Met Pro Glu Gly | | | |
| | 11110 | 11115 | 11120 |
| 10Leu Val Arg Gly Thr Val Thr Asp Pro Gly Arg Val Ala Phe Val Phe | | | |
| | 11125 | 11130 | 11135 |
| Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala Glu Leu Leu Asp | | | |
| | 11140 | 11145 | 11150 |
| Ser Ser Pro Glu Phe Ala Ala Ala Met Ala Glu Cys Glu Thr Ala Leu | | | |
| 15 | 11155 | 11160 | 11165 |
| Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val Arg Gln Ala Pro | | | |
| | 11170 | 11175 | 11180 |
| 11185 Ser Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln Pro Val Thr Phe | | | |
| | 11190 | 11195 | 11200 |
| 20Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His His Gly Ile Thr | | | |
| | 11205 | 11210 | 11215 |
| Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr | | | |
| | 11220 | 11225 | 11230 |
| Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg Val Val Thr Leu | | | |
| 25 | 11235 | 11240 | 11245 |
| Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys Gly Gly Met Ile | | | |
| | 11250 | 11255 | 11260 |
| 11265 Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg Ile Glu Asn Leu | | | |
| | 11270 | 11275 | 11280 |
| 30His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr Ala Thr Val Val | | | |
| | 11285 | 11290 | 11295 |
| Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln Ala Cys Glu Ala | | | |
| | 11300 | 11305 | 11310 |
| Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr Ala Ser His Ser | | | |
| 35 | 11315 | 11320 | 11325 |
| Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp Val Leu Ala Gly | | | |
| | 11330 | 11335 | 11340 |
| 11345 Leu Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser Thr Leu Glu Gly | | | |
| | 11350 | 11355 | 11360 |
| 40Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr Trp Tyr Arg Asn | | | |

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|---|-------|-------|-------|
| | 11365 | 11370 | 11375 |
| Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu Thr Leu Ala Thr | | | |
| | 11380 | 11385 | 11390 |
| Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala His Pro Val Leu | | | |
| 5 | 11395 | 11400 | 11405 |
| Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala Thr Leu Arg Arg | | | |
| | 11410 | 11415 | 11420 |
| 11425 Glu Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu Ala Glu Ala Trp | | | |
| | 11430 | 11435 | 11440 |
| 10 Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu Pro Ala Thr Gly | | | |
| | 11445 | 11450 | 11455 |
| Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr Ala Phe Gln His | | | |
| | 11460 | 11465 | 11470 |
| Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu Ala Pro Ala His | | | |
| 15 | 11475 | 11480 | 11485 |
| Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly Leu Ala Trp Gly | | | |
| | 11490 | 11495 | 11500 |
| 11505 Pro Gly Ala Glu Asp Leu Asp Glu Glu Gly Arg Arg Ser Ala Val Leu | | | |
| | 11510 | 11515 | 11520 |
| 20 Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg Cys Asp Ser Pro | | | |
| | 11525 | 11530 | 11535 |
| Glu Glu Val Pro Val Asp Arg Pro Leu Arg Glu Ile Gly Phe Asp Ser | | | |
| | 11540 | 11545 | 11550 |
| Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg Leu Thr Gly Leu | | | |
| 25 | 11555 | 11560 | 11565 |
| Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr Pro Val Ala Leu | | | |
| | 11570 | 11575 | 11580 |
| 11585 Ala Glu Arg Ile Ser Asp Glu Leu Ala Glu Arg Asn Trp Ala Val Ala | | | |
| | 11590 | 11595 | 11600 |
| 30 Glu Pro Ser Asp His Glu Gln Ala Glu Glu Glu Lys Ala Ala Ala Pro | | | |
| | 11605 | 11610 | 11615 |
| Ala Gly Ala Arg Ser Gly Ala Asp Thr Gly Ala Gly Ala Gly Met Phe | | | |
| | 11620 | 11625 | 11630 |
| Arg Ala Leu Phe Arg Gln Ala Val Glu Asp Asp Arg Tyr Gly Glu Phe | | | |
| 35 | 11635 | 11640 | 11645 |
| Leu Asp Val Leu Ala Glu Ala Ser Ala Phe Arg Pro Gln Phe Ala Ser | | | |
| | 11650 | 11655 | 11660 |
| 11665 Pro Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu Leu Ala Gly Gly | | | |
| | 11670 | 11675 | 11680 |
| 40 Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val Gly Cys Thr Gly | | | |

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|--|-------|-------|-------|
| | 11685 | 11690 | 11695 |
| Thr Ala Ala Asn Gly Gly Pro His Glu Phe Leu Arg Leu Ser Thr Ser | | | |
| 11700 | 11705 | 11710 | |
| Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu Pro Gly Tyr Gly | | | |
| 5 11715 | 11720 | 11725 | |
| Thr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala Asp Leu Asp Thr | | | |
| 11730 | 11735 | 11740 | 1 |
| Ala Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala Ala Gly Asp Ala | | | |
| 1745 11750 | 11755 | 11760 | |
| 10 Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu Leu Ala His Glu | | | |
| 11765 | 11770 | 11775 | |
| Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro Pro Ala Gly Ile | | | |
| 11780 | 11785 | 11790 | |
| Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu Pro Ile Glu Val | | | |
| 15 11795 | 11800 | 11805 | |
| Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly Glu Leu Glu Pro | | | |
| 11810 | 11815 | 11820 | 1 |
| Met Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr Ala Arg Phe Leu | | | |
| 1825 11830 | 11835 | 11840 | |
| 20 Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val Leu Leu Val Arg | | | |
| 11845 | 11850 | 11855 | |
| Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg Gly Asp Trp Arg | | | |
| 11860 | 11865 | 11870 | |
| Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val Pro Gly Asp His | | | |
| 25 11875 | 11880 | 11885 | |
| Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala Glu Ala Val Leu | | | |
| 11890 | 11895 | 11900 | 1 |
| Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala Gly Lys Met Thr | | | |
| 1905 11910 | 11915 | 11920 | |
| 30 Asp Arg Pro Leu Asn Val Asp Ser Gly Leu Trp Ile Arg Arg Phe His | | | |
| 11925 | 11930 | 11935 | |
| Pro Ala Pro Asn Ser Ala Val Arg Leu Val Cys Leu Pro His Ala Gly | | | |
| 11940 | 11945 | 11950 | |
| Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His Pro Ser | | | |
| 35 11955 | 11960 | 11965 | |
| Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg Ala | | | |
| 11970 | 11975 | 11980 | 1 |
| Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val Val Ala | | | |
| 1985 11990 | 11995 | 12000 | |
| 40 Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe Gly His | | | |

| | | | |
|--|-------|-------|-------|
| | 12005 | 12010 | 12015 |
| Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu Glu Gln | | | |
| | 12020 | 12025 | 12030 |
| Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg Arg Ala | | | |
| 5 | 12035 | 12040 | 12045 |
| Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp Arg Ala | | | |
| | 12050 | 12055 | 12060 |
| Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg Phe Leu | | | |
| 2065 | 12070 | 12075 | 12080 |
| 10Gln Asp Asp Glu Leu Leu Arg Leu Val Leu Pro Ala Leu Arg Ser Asp | | | |
| | 12085 | 12090 | 12095 |
| Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys Leu Thr | | | |
| | 12100 | 12105 | 12110 |
| Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala Pro Leu | | | |
| 15 | 12115 | 12120 | 12125 |
| Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe Cys Leu | | | |
| | 12130 | 12135 | 12140 |
| Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp His Glu | | | |
| 2145 | 12150 | 12155 | 12160 |
| 20Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly Ala Pro | | | |
| | 12165 | 12170 | 12175 |
| Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly Ala Ala | | | |
| | 12180 | 12185 | 12190 |
| Lys Arg Trp Gln Asn Pro Arg | | | |
| 25 | 12195 | 1 | |
| 30 <210> 7 | | | |
| <211> 1248 | | | |
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| <213> Streptomyces venezuelae | | | |
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| ctcctcgtgg ggccggccaa ccgcacatcgac cgcgcacaggc tgtacgagcg gctcgaccgg 120 | | | |
| gccttcgaca gccagtggtt gtccaaacggc ggcccgctcg tccgcgagtt cgaggagcgc 180 | | | |
| gtccgcgggc tcgcccgggtt ccggcatgcc gtggccaccc gcaacgcccac ggccgggctc 240 | | | |
| 40 cagtcctcg cgcacgcccgc cgccctcacc ggcgaagtga tcatgccgtc gatgacgttc 300 | | | |

| | | | | | | | |
|------------|------------|------------|------------|------------|------------|-----------|------|
| gcccaccc | cgacacgt | gctggatc | ggctcaccc | cggtttcg | cgacatcgac | 360 | |
| ccgacacccg | gaaacctcg | ccggaccag | gtggcccg | cggtcacacc | ccgcacctcg | 420 | |
| gcccgtcg | gcgtccac | ctggggccgc | ccctgcgc | ccgaccagct | gcgaaagg | 480 | |
| gcccacgagc | acggcctcg | gctgtactc | gacgcccgc | acgcccctcg | ctgcgcgg | 540 | |
| 5 | gacggccggc | ccgcccgc | cctcgcc | gcccgggt | tca | 600 | |
| gcccgtcaac | ggtttcg | ggccgcgc | gtcacc | acgcccac | cgccgc | 660 | |
| atcccgcccc | tccacaactt | cggttcg | ctgcccgg | gca | ccccgc | 720 | |
| aacccaaga | tgagcgagg | cgccgcgc | atgggcct | cctccctcg | cgcg | 780 | |
| gaggtcatcg | accgaaacc | gcaaccac | gcccctacc | gca | ggacactc | 840 | |
| 10 | cccgccgtcc | tcgtcgcc | ccacgacc | ca | accacca | gtacgtatc | 900 |
| gtcgagatcg | acgaggccac | caccggatc | caccgc | tcgtcat | gg | 960 | |
| gccaaggcg | tgcacacccg | cgctactt | tcgcccgg | gca | ccgtac | 1020 | |
| cgccggc | cgacgc | gctgcgc | accgaac | tcgcccgc | cg | 1080 | |
| ctgcccacc | gcaccgc | cg | gacatcc | gg | gtcg | 1140 | |
| 15 | ctctgcgc | cccgccgc | cgaactgacc | g | gacac | ggc | 1200 |
| ctcgccccc | cccagacatc | ca | gcccac | at | ggac | cgct | 1248 |

| | | | | | | |
|----|---|--|--|--|--|--|
| 20 | <210> 8 | | | | | |
| | <211> 415 | | | | | |
| | 20 <212> PRT | | | | | |
| | <213> Streptomyces venezuelae | | | | | |
| | | | | | | |
| | <400> 8 | | | | | |
| | Met Lys Ser Ala Leu Ser Asp Leu Ala Phe Phe Gly Gly Pro Ala Ala | | | | | |
| 25 | 1 5 10 15 | | | | | |
| | Phe Asp Gln Pro Leu Leu Val Gly Arg Pro Asn Arg Ile Asp Arg Ala | | | | | |
| | 20 25 30 | | | | | |
| | Arg Leu Tyr Glu Arg Leu Asp Arg Ala Leu Asp Ser Gln Trp Leu Ser | | | | | |
| | 35 40 45 | | | | | |
| 30 | Asn Gly Gly Pro Leu Val Arg Glu Phe Glu Glu Arg Val Ala Gly Leu | | | | | |
| | 50 55 60 | | | | | |
| | Ala Gly Val Arg His Ala Val Ala Thr Cys Asn Ala Thr Ala Gly Leu | | | | | |
| | 65 70 75 80 | | | | | |
| | Gln Leu Leu Ala His Ala Ala Gly Leu Thr Gly Glu Val Ile Met Pro | | | | | |
| 35 | 85 90 95 | | | | | |
| | Ser Met Thr Phe Ala Ala Thr Pro His Ala Leu Arg Trp Ile Gly Leu | | | | | |
| | 100 105 110 | | | | | |
| | Thr Pro Val Phe Ala Asp Ile Asp Pro Asp Thr Gly Asn Leu Asp Pro | | | | | |
| | 115 120 125 | | | | | |
| 40 | Asp Gln Val Ala Ala Val Thr Pro Arg Thr Ser Ala Val Val Gly | | | | | |

| | | | |
|--|-----|-----|-----|
| 130 | 135 | 140 | |
| Val His Leu Trp Gly Arg Pro Cys Ala Ala Asp Gln Leu Arg Lys Val | | | |
| 145 | 150 | 155 | 160 |
| Ala Asp Glu His Gly Leu Arg Leu Tyr Phe Asp Ala Ala His Ala Leu | | | |
| 5 | 165 | 170 | 175 |
| Gly Cys Ala Val Asp Gly Arg Pro Ala Gly Ser Leu Gly Asp Ala Glu | | | |
| 180 | 185 | 190 | |
| Val Phe Ser Phe His Ala Thr Lys Ala Val Asn Ala Phe Glu Gly Gly | | | |
| 195 | 200 | 205 | |
| 10 Ala Val Val Thr Asp Asp Ala Asp Leu Ala Ala Arg Ile Arg Ala Leu | | | |
| 210 | 215 | 220 | |
| His Asn Phe Gly Phe Asp Leu Pro Gly Gly Ser Pro Ala Gly Gly Thr | | | |
| 225 | 230 | 235 | 240 |
| Asn Ala Lys Met Ser Glu Ala Ala Ala Ala Met Gly Leu Thr Ser Leu | | | |
| 15 | 245 | 250 | 255 |
| Asp Ala Phe Pro Glu Val Ile Asp Arg Asn Arg Arg Asn His Ala Ala | | | |
| 260 | 265 | 270 | |
| Tyr Arg Glu His Leu Ala Asp Leu Pro Gly Val Leu Val Ala Asp His | | | |
| 275 | 280 | 285 | |
| 20 Asp Arg His Gly Leu Asn Asn His Gln Tyr Val Ile Val Glu Ile Asp | | | |
| 290 | 295 | 300 | |
| Glu Ala Thr Thr Gly Ile His Arg Asp Leu Val Met Glu Val Leu Lys | | | |
| 305 | 310 | 315 | 320 |
| Ala Glu Gly Val His Thr Arg Ala Tyr Phe Ser Pro Gly Cys His Glu | | | |
| 25 | 325 | 330 | 335 |
| Leu Glu Pro Tyr Arg Gly Gln Pro His Ala Pro Leu Pro His Thr Glu | | | |
| 340 | 345 | 350 | |
| Arg Leu Ala Ala Arg Val Leu Ser Leu Pro Thr Gly Thr Ala Ile Gly | | | |
| 355 | 360 | 365 | |
| 30 Asp Asp Asp Ile Arg Arg Val Ala Asp Leu Leu Arg Leu Cys Ala Thr | | | |
| 370 | 375 | 380 | |
| Arg Gly Arg Glu Leu Thr Ala Arg His Arg Asp Thr Ala Pro Ala Pro | | | |
| 385 | 390 | 395 | 400 |
| Leu Ala Ala Pro Gln Thr Ser Thr Pro Thr Ile Gly Arg Ser Arg | | | |
| 35 | 405 | 410 | 415 |

<210> 9

<211> 1458

<212> DNA

40 <213> Streptomyces venezuelae

<400> 9

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| gatctggggg | cggcggtcca | cgccgtcgcc | cagaccctcg | ccgcccgggg | cctcgtcccg | 120 | |
| cccgacgagg | ccggaacgac | cgccccccac | ctcgtccggc | tgcggcgac | ctacggcaac | 180 | |
| 5 | agcccccttca | ccccgctgga | ggaggccccgc | cacgacctgg | ggtcgaccg | ggacgccttc | 240 |
| | cggcgctcc | tcgcccgtt | cgggagctcc | gcaccgcgg | cgagacccgc | 300 | |
| | cccgccgggg | cgtactggaa | gaacaccctg | ctcccgctcg | aacagcgcgg | cgtcttcgac | 360 |
| | gcggcgctcg | ccaggaagcc | cgtcttccc | tacagcgctcg | gcctctaccc | cgccccgacc | 420 |
| | tgcacgttcc | gctgccactt | ctgcgtccgt | gtgaccggcg | cccgctacga | cccgctccgccc | 480 |
| 10 | ctcgacgccc | gcaacgccc | gttccggctcg | gtcatcgacg | agataaccgc | ggcaaccccc | 540 |
| | tcggcgatgt | acttctccgg | cggcctggag | cggctcacca | accccgccct | cgggagccctg | 600 |
| | ggccgcacg | ccaccgacca | cggcctgcgg | cccaccgtct | acacgaactc | cttcgcgc | 660 |
| | accgagcgca | ccctggagcg | ccagccccgc | ctctggggcc | tgcacgccc | ccgcaccc | 720 |
| | ctctacggcc | tcaacgacga | ggagtacgag | cagaccaccg | gcaagaaggc | cgccctccgc | 780 |
| 15 | cgcgtccgcg | agaacctgcg | ccgcttccag | cagctgcgcg | ccgagcgcga | gtcgccgatc | 840 |
| | aacctcggt | tcgcctacat | cgtgctccc | ggccgtgcct | ccgcctgct | cgacctggtc | 900 |
| | gacttcatcg | ccgaccta | cgacgcggg | cagggcagga | cgatcgactt | cgtcaacatt | 960 |
| | cgcgaggact | acagcgccg | tgacgacggc | aagctgcgc | aggaggagcg | ggccgagctc | 1020 |
| | caggaggccc | tcaacgcctt | cgaggagcg | gtccgcgagc | gcaccccccgg | actccacatc | 1080 |
| 20 | gactacggct | acgccc | cagcctgcgc | accggggccg | acgccc | act gtcggatc | 1140 |
| | aagccgcca | ccatgcggcc | caccgcgcac | ccgcaggctcg | cgtgcaggt | cgatctcc | 1200 |
| | ggcgacgtgt | acctgtaccg | cgaggccggc | ttccccgacc | tggacggcgc | gacccgctac | 1260 |
| | atcgccggcc | cggtgaccccc | cgacacctcc | ctcaccgagg | tgcgcaggga | cttcgtcgag | 1320 |
| | cgcggccggcg | agggtggccgc | cgatcgacggc | gacgagtact | tcatggacgg | cttcgtatcag | 1380 |
| 25 | gtcggtcaccg | ccgcctgaa | ccagctggag | cgcgcacgc | cgacggctg | ggaggaggcc | 1440 |
| | cgccgcttcc | tgcgtga | | | | | 1458 |

<210> 10

<211> 485

30 <212> PRT

<213> *Streptomyces venezuelae*

<400> 10

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His Pro Gly Ala Asp Leu Gly Ala Ala Val His Ala Val Gly Gln Thr

20 25 30

Leu Ala Ala Gly Gly Leu Val Pro Pro Asp Glu Ala Gly Thr Thr Ala

35 40 45

40 Arg His Leu Val Arg Leu Ala Val Arg Tyr Gly Asn Ser Pro Phe Thr

| 50 | 55 | 60 |
|--|-----|-----|
| Pro Leu Glu Glu Ala Arg His Asp Leu Gly Val Asp Arg Asp Ala Phe | | |
| 65 | 70 | 75 |
| Arg Arg Leu Leu Ala Leu Phe Gly Gln Val Pro Glu Leu Arg Thr Ala | | |
| 5 | 85 | 90 |
| Val Glu Thr Gly Pro Ala Gly Ala Tyr Trp Lys Asn Thr Leu Leu Pro | | |
| 100 | 105 | 110 |
| Leu Glu Gln Arg Gly Val Phe Asp Ala Ala Leu Ala Arg Lys Pro Val | | |
| 115 | 120 | 125 |
| 10 Phe Pro Tyr Ser Val Gly Leu Tyr Pro Gly Pro Thr Cys Met Phe Arg | | |
| 130 | 135 | 140 |
| Cys His Phe Cys Val Arg Val Thr Gly Ala Arg Tyr Asp Pro Ser Ala | | |
| 145 | 150 | 155 |
| Leu Asp Ala Gly Asn Ala Met Phe Arg Ser Val Ile Asp Glu Ile Pro | | |
| 15 | 165 | 170 |
| Ala Gly Asn Pro Ser Ala Met Tyr Phe Ser Gly Gly Leu Glu Pro Leu | | |
| 180 | 185 | 190 |
| Thr Asn Pro Gly Leu Gly Ser Leu Ala Ala His Ala Thr Asp His Gly | | |
| 195 | 200 | 205 |
| 20 Leu Arg Pro Thr Val Tyr Thr Asn Ser Phe Ala Leu Thr Glu Arg Thr | | |
| 210 | 215 | 220 |
| Leu Glu Arg Gln Pro Gly Leu Trp Gly Leu His Ala Ile Arg Thr Ser | | |
| 225 | 230 | 235 |
| Leu Tyr Gly Leu Asn Asp Glu Glu Tyr Glu Gln Thr Thr Gly Lys Lys | | |
| 25 | 245 | 250 |
| Ala Ala Phe Arg Arg Val Arg Glu Asn Leu Arg Arg Phe Gln Gln Leu | | |
| 260 | 265 | 270 |
| Arg Ala Glu Arg Glu Ser Pro Ile Asn Leu Gly Phe Ala Tyr Ile Val | | |
| 275 | 280 | 285 |
| 30 Leu Pro Gly Arg Ala Ser Arg Leu Leu Asp Leu Val Asp Phe Ile Ala | | |
| 290 | 295 | 300 |
| Asp Leu Asn Asp Ala Gly Gln Gly Arg Thr Ile Asp Phe Val Asn Ile | | |
| 305 | 310 | 315 |
| Arg Glu Asp Tyr Ser Gly Arg Asp Asp Gly Lys Leu Pro Gln Glu Glu | | |
| 35 | 325 | 330 |
| Arg Ala Glu Leu Gln Glu Ala Leu Asn Ala Phe Glu Glu Arg Val Arg | | |
| 340 | 345 | 350 |
| Glu Arg Thr Pro Gly Leu His Ile Asp Tyr Gly Tyr Ala Leu Asn Ser | | |
| 355 | 360 | 365 |
| 40 Leu Arg Thr Gly Ala Asp Ala Glu Leu Leu Arg Ile Lys Pro Ala Thr | | |

| | | | |
|--|-----|-----|-----|
| 370 | 375 | 380 | |
| Met Arg Pro Thr Ala His Pro Gln Val Ala Val Gln Val Asp Leu Leu | | | |
| 385 | 390 | 395 | 400 |
| Gly Asp Val Tyr Leu Tyr Arg Glu Ala Gly Phe Pro Asp Leu Asp Gly | | | |
| 5 | 405 | 410 | 415 |
| Ala Thr Arg Tyr Ile Ala Gly Arg Val Thr Pro Asp Thr Ser Leu Thr | | | |
| 420 | 425 | 430 | |
| Glu Val Val Arg Asp Phe Val Glu Arg Gly Gly Glu Val Ala Ala Val | | | |
| 435 | 440 | 445 | |
| 10 Asp Gly Asp Glu Tyr Phe Met Asp Gly Phe Asp Gln Val Val Thr Ala | | | |
| 450 | 455 | 460 | |
| Arg Leu Asn Gln Leu Glu Arg Asp Ala Ala Asp Gly Trp Glu Glu Ala | | | |
| 465 | 470 | 475 | 480 |
| Arg Gly Phe Leu Arg | | | |
| 15 | 485 | | |

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<211> 879
<212> DNA
20    <213> Streptomyces venezuelae

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25  ctcatgctcg gcggatttcg cgagattcaa atcatctcga ccccccagca catcgaactc
ttccagtcgc ttctcgaaa cggcaggcac ctggaatag aactcgacta tgcggtccag
aaagagccccg caggaatcgc ggacgcactt ctcgtcgag ccgagcacat cggcgacgac
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cgggacagca tcgcgcgcct cgacggctgc gtgctttcg gctacccggt caaggacccc
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cccgtcaagc cgcgctccaa cctcgccgtc accggcctct acctctacga caacgacgtc
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35  gaggagcggc agggcgctcg gatcgccggc cttgaggaga tcgccttcgg catggccttc
atcgacgccc aggcctgtca cggcctggga gaaggcctct cccgcaccga gtacggcagc
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40    <210> 12
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<212> PRT

<213> *Streptomyces venezuelae*

<400> 12

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 Ala Thr Ser Val Ile Ser Lys Gln Ile Leu Pro Val Tyr Asn Lys Pro
 20 25 30
 Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Gly Gly Ile Arg Glu
 10 35 40 45
 Ile Gln Ile Ile Ser Thr Pro Gln His Ile Glu Leu Phe Gln Ser Leu
 50 55 60
 Leu Gly Asn Gly Arg His Leu Gly Ile Glu Leu Asp Tyr Ala Val Gln
 65 70 75 80
 15 Lys Glu Pro Ala Gly Ile Ala Asp Ala Leu Leu Val Gly Ala Glu His
 . 85 90 95
 Ile Gly Asp Asp Thr Cys Ala Leu Ile Leu Gly Asp Asn Ile Phe His
 100 105 110
 Gly Pro Gly Leu Tyr Thr Leu Leu Arg Asp Ser Ile Ala Arg Leu Asp
 20 115 120 125
 Gly Cys Val Leu Phe Gly Tyr Pro Val Lys Asp Pro Glu Arg Tyr Gly
 130 135 140
 Val Ala Glu Val Asp Ala Thr Gly Arg Leu Thr Asp Leu Val Glu Lys
 145 150 155 160
 25 Pro Val Lys Pro Arg Ser Asn Leu Ala Val Thr Gly Leu Tyr Leu Tyr
 165 170 175
 Asp Asn Asp Val Val Asp Ile Ala Lys Asn Ile Arg Pro Ser Pro Arg
 180 185 190
 Gly Glu Leu Glu Ile Thr Asp Val Asn Arg Val Tyr Leu Glu Arg Gly
 30 195 200 205
 Arg Ala Glu Leu Val Asn Leu Gly Arg Gly Phe Ala Trp Leu Asp Thr
 210 215 220
 Gly Thr His Asp Ser Leu Leu Arg Ala Ala Gln Tyr Val Gln Val Leu
 225 230 235 240
 35 Glu Glu Arg Gln Gly Val Trp Ile Ala Gly Leu Glu Glu Ile Ala Phe
 245 250 255
 Arg Met Gly Phe Ile Asp Ala Glu Ala Cys His Gly Leu Gly Glu Gly
 260 265 270
 Leu Ser Arg Thr Glu Tyr Gly Ser Tyr Leu Met Glu Ile Ala Gly Arg
 40 275 280 285

Glu Gly Ala Pro

290

<210> 13

5 <211> 1014

<212> DNA

<213> Streptomyces venezuelae

<400> 13

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| | tacgcgggca accgcggcaa cctcgccccg gtggacgcgg accccgcact ggcgttcgtc | 180 |
| | cacggcgaca tccgcgacgc cggcctcctc gcccgggaac tgcgcggcgt ggacgcac | 240 |
| | gtccacttcg cggccgagag ccacgtggac cgctccatcg cggcgcgtc cgtttcacc | 300 |
| 15 | gagaccaacg tgcagggcac gcagacgctg ctccagtgcg ccgtcgacgc cggcgtcg | 360 |
| | cggcgtgc acgtctccac cgacgaggta tacgggtcga tcgactccgg ctccctggacc | 420 |
| | gagacgagcc cgctggagcc caactcgccc tacgcggcgt ccaaggccgg ctccgac | 480 |
| | gttgcggcg cctaccacccg gacgtacggc ctgcacgtac ggatcaccgg ctgctgca | 540 |
| | aactacgggc cgtaccagca ccccgagaag ctcatcccc tcttcgtgac gaacccctc | 600 |
| 20 | gacggcggga cgctcccgct gtacggcgac ggccgaaacg tccgcgagtg ggtgcacacc | 660 |
| | gacgaccact gccggggcat cgcgctcgtc ctcgcggcg gccggggccgg cgagatctac | 720 |
| | cacatcgccg gccggcttga gctgaccaac cgcaactca ccggcatcct cctggactcg | 780 |
| | ctcggcgccg actggtcctc ggtccggaaag gtcgcgacc gcaaggccca cgacctgc | 840 |
| | tactccctcg acggcggcga gategagcgc gagctcgct accgcccga ggtctc | 900 |
| 25 | 960 | |
| | ctcaaggcga cggcccgca gctggccgca accgccgtgg aggtgtccgc gtga | 1014 |

<210> 14

<211> 337

30 <212> PRT

<213> Streptomyces venezuelae

<400> 14

Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe

35 1 5 10 15

Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Val Pro Ala Asp Glu

20 25 30

Val Ile Val Leu Asp Ser Leu Thr Tyr Ala Gly Asn Arg Ala Asn Leu

35 40 45

40 Ala Pro Val Asp Ala Asp Pro Arg Leu Arg Phe Val His Gly Asp Ile

| | | | |
|--|-----|-----|-----|
| 50 | 55 | 60 | |
| Arg Asp Ala Gly Leu Leu Ala Arg Glu Leu Arg Gly Val Asp Ala Ile | | | |
| 65 | 70 | 75 | 80 |
| Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Ala Gly Ala | | | |
| 5 | 85 | 90 | 95 |
| Ser Val Phe Thr Glu Thr Asn Val Gln Gly Thr Gln Thr Leu Leu Gln | | | |
| 100 | 105 | 110 | |
| Cys Ala Val Asp Ala Gly Val Gly Arg Val Val His Val Ser Thr Asp | | | |
| 115 | 120 | 125 | |
| 10 Glu Val Tyr Gly Ser Ile Asp Ser Gly Ser Trp Thr Glu Ser Ser Pro | | | |
| 130 | 135 | 140 | |
| Leu Glu Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu | | | |
| 145 | 150 | 155 | 160 |
| Val Ala Arg Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Ile Thr | | | |
| 15 | 165 | 170 | 175 |
| Arg Cys Cys Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Leu Ile | | | |
| 180 | 185 | 190 | |
| Pro Leu Phe Val Thr Asn Leu Leu Asp Gly Gly Thr Leu Pro Leu Tyr | | | |
| 195 | 200 | 205 | |
| 20 Gly Asp Gly Ala Asn Val Arg Glu Trp Val His Thr Asp Asp His Cys | | | |
| 210 | 215 | 220 | |
| Arg Gly Ile Ala Leu Val Leu Ala Gly Gly Arg Ala Gly Glu Ile Tyr | | | |
| 225 | 230 | 235 | 240 |
| His Ile Gly Gly Leu Glu Leu Thr Asn Arg Glu Leu Thr Gly Ile | | | |
| 25 | 245 | 250 | 255 |
| Leu Leu Asp Ser Leu Gly Ala Asp Trp Ser Ser Val Arg Lys Val Ala | | | |
| 260 | 265 | 270 | |
| Asp Arg Lys His Asp Leu Arg Tyr Ser Leu Asp Gly Gly Glu Ile | | | |
| 275 | 280 | 285 | |
| 30 Glu Arg Glu Leu Gly Tyr Arg Pro Gln Val Ser Phe Ala Asp Gly Leu | | | |
| 290 | 295 | 300 | |
| Ala Arg Thr Val Arg Trp Tyr Arg Glu Asn Arg Gly Trp Trp Glu Pro | | | |
| 305 | 310 | 315 | 320 |
| Leu Lys Ala Thr Ala Pro Gln Leu Pro Ala Thr Ala Val Glu Val Ser | | | |
| 35 | 325 | 330 | 335 |
| Ala | | | |

<210> 15

40 <211> 1140

<212> DNA

<213> Streptomyces venezuelae

<400> 15

| | | | | | | | |
|----|-------------|--------------|--------------|------------|-------------|------------|------|
| 5 | gtgagcagcc | gcgcccggagac | ccccccggcgtc | cccttcctcg | acctcaaggc | cgcctacgag | 60 |
| | gagctcccg | cgagaccga | cgcccgatc | gccccgtcc | tcgactcgaa | gctactaccc | 120 |
| | ctccggaccc | aactcgaagg | attcgaggcg | gagttcgcc | cgtactgcga | gacggaccac | 180 |
| | gcccgtcg | tgaacagcg | gatggacgccc | ctccagctcg | ccctccgg | cctcggcatc | 240 |
| | ggacccgggg | acgaggtgat | cgtccctcg | cacacgtaca | tcgcccagctg | gctcgcggtg | 300 |
| 10 | tccggccacc | gcgcgacccc | cgtgcccgtc | gagccgcacg | aggaccaccc | caccctggac | 360 |
| | ccgctgtcg | tcgagaaggc | gatcacc | cgccacccgg | cgtccctccc | cgtccaccc | 420 |
| | tacgggcacc | ccgcccacat | ggacgccc | cgcgagctcg | cggaccggca | cggcctgcac | 480 |
| | atcgctcgagg | acgcccgc | ggcccacggc | gcccgtacc | ggggccggcg | gatcggcgcc | 540 |
| | gggtcg | tggccgcgtt | cagttctac | ccgggcaaga | acctcggctg | cttcggcgac | 600 |
| 15 | ggggggcgcc | tcgtcacc | cgaccccgag | ctcgccgaac | ggctccggat | gtccgcac | 660 |
| | tacggctcg | ggcagaagta | cagccacgag | acgaaggcg | ccaaactccc | cctggacgag | 720 |
| | atgcaggcc | ccgtgctcg | gatccggctc | gcccacctgg | acagctggaa | cgccgcagg | 780 |
| | tcggcgctgg | ccgcccgg | cctctccgg | ctcgccggac | tgcccggat | cggcctgc | 840 |
| | gtgaccgc | ccgacacc | cccggtctgg | cacctttca | ccgtgcgcac | cgagcgcgc | 900 |
| 20 | gacgagctgc | gcagccac | cgacgcccgc | ggcatcgaca | ccctcacgca | ctaccggta | 960 |
| | cccg | tctcgccc | ctacgcggc | gaggcaccgc | cggaaggctc | gtcccgccg | 1020 |
| | gccc | gagact | tcgcgcggc | ggtcctc | ctgcccgc | gcccgcac | 1080 |
| | cagg | cgctgc | gggtgatc | cgccgtgc | gaatggccg | agcgggtc | 1140 |

25 <210> 16

<211> 379

<212> PRT

<213> Streptomyces venezuelae

30 <400> 16

Met Ser Ser Arg Ala Glu Thr Pro Arg Val Pro Phe Leu Asp Leu Lys

1 5 10 15

Ala Ala Tyr Glu Glu Leu Arg Ala Glu Thr Asp Ala Ala Ile Ala Arg

20 25 30

35 Val Leu Asp Ser Gly Arg Tyr Leu Leu Gly Pro Glu Leu Glu Gly Phe

35 40 45

Glu Ala Glu Phe Ala Ala Tyr Cys Glu Thr Asp His Ala Val Gly Val

50 55 60

Asn Ser Gly Met Asp Ala Leu Gln Leu Ala Leu Arg Gly Leu Gly Ile

40 65 70 75 80

Gly Pro Gly Asp Glu Val Ile Val Pro Ser His Thr Tyr Ile Ala Ser
 85 90 . 95
 Trp Leu Ala Val Ser Ala Thr Gly Ala Thr Pro Val Pro Val Glu Pro
 100 105 110
 5 His Glu Asp His Pro Thr Leu Asp Pro Leu Leu Val Glu Lys Ala Ile
 115 120 125
 Thr Pro Arg Thr Arg Ala Leu Leu Pro Val His Leu Tyr Gly His Pro
 130 135 140
 Ala Asp Met Asp Ala Leu Arg Glu Leu Ala Asp Arg His Gly Leu His
 10 145 150 155 160
 Ile Val Glu Asp Ala Ala Gln Ala His Gly Ala Arg Tyr Arg Gly Arg
 165 170 175
 Arg Ile Gly Ala Gly Ser Ser Val Ala Ala Phe Ser Phe Tyr Pro Gly
 180 185 190
 15 Lys Asn Leu Gly Cys Phe Gly Asp Gly Gly Ala Val Val Thr Gly Asp
 195 200 205
 Pro Glu Leu Ala Glu Arg Leu Arg Met Leu Arg Asn Tyr Gly Ser Arg
 210 215 220
 Gln Lys Tyr Ser His Glu Thr Lys Gly Thr Asn Ser Arg Leu Asp Glu
 20 225 230 235 240
 Met Gln Ala Ala Val Leu Arg Ile Arg Leu Ala His Leu Asp Ser Trp
 245 250 255
 Asn Gly Arg Arg Ser Ala Leu Ala Ala Glu Tyr Leu Ser Gly Leu Ala
 260 265 270
 25 Gly Leu Pro Gly Ile Gly Leu Pro Val Thr Ala Pro Asp Thr Asp Pro
 275 280 285
 Val Trp His Leu Phe Thr Val Arg Thr Glu Arg Arg Asp Glu Leu Arg
 290 295 300
 Ser His Leu Asp Ala Arg Gly Ile Asp Thr Leu Thr His Tyr Pro Val
 30 305 310 315 320
 Pro Val His Leu Ser Pro Ala Tyr Ala Gly Glu Ala Pro Pro Glu Gly
 325 330 335
 Ser Leu Pro Arg Ala Glu Ser Phe Ala Arg Gln Val Leu Ser Leu Pro
 340 345 350
 35 Ile Gly Pro His Leu Glu Arg Pro Gln Ala Leu Arg Val Ile Asp Ala
 355 360 365
 Val Arg Glu Trp Ala Glu Arg Val Asp Gln Ala
 370 375

<211> 714

<212> DNA

<213> Streptomyces venezuelae

5 <400> 17

| | | | | | | |
|---------------|-------------|------------|-------------|------------|------------|-----|
| gtgtacgaag | tcgaccacgc | cgacgtctac | gacctttct | acctgggtcg | cggaaggac | 60 |
| tacgcccggc | aggcctccga | catcgccgac | ctggtgcgct | cccgtaaaaa | cgaggcctcc | 120 |
| tcgctcctgg | acgtggcctg | cgtacgggc | acgcatactgg | agcacttcac | caaggagttc | 180 |
| ggcgacaccc | ccggccctgga | gctgtccgag | gacatgtca | cccacgcccc | caagcggctg | 240 |
| 10 cccgacgcca | cgctccacca | gggcgacatg | cgggacttcc | ggctcgcccg | gaagttctcc | 300 |
| gccgtggta | gcatgttcag | ctccgtcgcc | tacctgaaga | cgaccgagga | actcggcg | 360 |
| gccgtcgcc | cggtcgccg | gcacctggag | cccggtggcg | tctcggtcg | cgagccgtgg | 420 |
| tggttcccg | agaccttcgc | cgacggctgg | gtcagcgccg | acgtcgccg | ccgtgacggg | 480 |
| cgcaccgtgg | cccgtgtc | gcactcggtg | cgggagggga | acgcgacg | catggagg | 540 |
| 15 cacttcaccc | tggccgaccc | ggcaagggc | gtgcggact | tctccgacgt | ccatctcatc | 600 |
| accctgttcc | accaggccga | gtacgaggcc | gcgttacgg | ccgcgggct | gcgcgtcg | 660 |
| tacctggagg | gcggcccg | ggccgtggc | ctctcg | gcgtccccgc | ctga | 714 |

<210> 18

20 <211> 237

<212> PRT

<213> Streptomyces venezuelae

<400> 18

25 Met Tyr Glu Val Asp His Ala Asp Val Tyr Asp Leu Phe Tyr Leu Gly

1 5 10 15

Arg Gly Lys Asp Tyr Ala Ala Glu Ala Ser Asp Ile Ala Asp Leu Val

20 25 30

Arg Ser Arg Thr Pro Glu Ala Ser Ser Leu Leu Asp Val Ala Cys Gly

30 35 40 45

Thr Gly Thr His Leu Glu His Phe Thr Lys Glu Phe Gly Asp Thr Ala

50 55 60

Gly Leu Glu Leu Ser Glu Asp Met Leu Thr His Ala Arg Lys Arg Leu

65 70 75 80

35 Pro Asp Ala Thr Leu His Gln Gly Asp Met Arg Asp Phe Arg Leu Gly

85 90 95

Arg Lys Phe Ser Ala Val Val Ser Met Phe Ser Ser Val Gly Tyr Leu

100 105 110

Lys Thr Thr Glu Glu Leu Gly Ala Ala Val Ala Ser Phe Ala Glu His

40 115 120 125

Leu Glu Pro Gly Gly Val Val Val Val Glu Pro Trp Trp Phe Pro Glu
 130 135 140
 Thr Phe Ala Asp Gly Trp Val Ser Ala Asp Val Val Arg Arg Asp Gly
 145 150 155 160
 5 Arg Thr Val Ala Arg Val Ser His Ser Val Arg Glu Gly Asn Ala Thr
 165 170 175
 Arg Met Glu Val His Phe Thr Val Ala Asp Pro Gly Lys Gly Val Arg
 180 185 190
 His Phe Ser Asp Val His Leu Ile Thr Leu Phe His Gln Ala Glu Tyr
 10 195 200 205
 Glu Ala Ala Phe Thr Ala Ala Gly Leu Arg Val Glu Tyr Leu Glu Gly
 210 215 220
 Gly Pro Ser Gly Arg Gly Leu Phe Val Gly Val Pro Ala
 225 230 235

15
 <210> 19
 <211> 1281
 <212> DNA
 <213> *Streptomyces venezuelae*

20
 <400> 19

| | | | | | | |
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| atgcgcgtcc | tgctgacctc | gttcgcacat | cacacgca | actacggcct | ggtgccctg | 60 |
| gcctgggcgc | tgctcgccgc | cgggcagcag | gtgcgggtcg | ccagccagcc | cgcgctc | 120 |
| gacaccatca | ccgggtccgg | gtcgccgcg | gtgcgggtcg | gcaccgacca | cctcatccac | 180 |
| 25 gagtaccggg | tgcgatggc | ggcgagccg | cgcggaa | atccggcgat | cgccttcgac | 240 |
| gaggcccg | ccgagccg | ggactgg | cacgc | gcacgc | gatcctcgcc | 300 |
| ccgtacttcc | atctgtcg | caacaacgac | tcgatgg | acgac | cgacttcg | 360 |
| cggtcctggc | agccggac | gtgtgtgg | gagccgacg | cctacgc | cgccgtcg | 420 |
| gcccagg | ccggtgc | gcacgccc | gtcctgt | ggccgcac | gatggcag | 480 |
| 30 gcccggca | agttcg | gctgcgg | cggcagcc | ccgagcacc | cgaggac | 540 |
| accgcgg | ggctgac | gacgctc | cggtacgg | cctc | agaggag | 600 |
| ctcacgg | atttcac | cgacccg | ccgc | cgac | cgactgg | 660 |
| ccgaccgt | ggatgcgtt | tg | tg | gg | gtcg | 720 |
| agt | aa | acggcac | cggtcg | ggactgg | gtcg | 780 |
| 35 ctcggcg | acggcg | gtcagg | cgctcg | cctcg | gatcgac | 840 |
| gagctcg | ccacgct | cgcg | cgccg | cccga | agac | 900 |
| acccgg | cgacttc | gtcgat | ccgtc | cgatc | gtcgat | 960 |
| caccacgg | ggcgg | ccat | acgcgg | ggcgat | cgat | 1020 |
| 40 ttcttc | cgccggcc | gctcac | ccgc | gggac | cgatc | 1080 |
| | | | | | | 1140 |

ctcgacgacc cctcggtcgc caccgcccgcg caccggctgc gcgaggagac cttcggcgac 1200
 cccaccccg cgccggatcg ccccgagctg gagcggctcg ccgcgcagca ccgcccggccg 1260
 ccggccgacg cccggcactg a 1281

5 <210> 20
 <211> 426
 <212> PRT
 <213> Streptomyces venezuelae

10 <400> 20
 Met Arg Val Leu Leu Thr Ser Phe Ala His His Thr His Tyr Tyr Gly
 1 5 10 15
 Leu Val Pro Leu Ala Trp Ala Leu Leu Ala Ala Gly His Glu Val Arg
 20 25 30
 15 Val Ala Ser Gln Pro Ala Leu Thr Asp Thr Ile Thr Gly Ser Gly Leu
 35 40 45
 Ala Ala Val Pro Val Gly Thr Asp His Leu Ile His Glu Tyr Arg Val
 50 55 60
 Arg Met Ala Gly Glu Pro Arg Pro Asn His Pro Ala Ile Ala Phe Asp
 20 65 70 75 80
 Glu Ala Arg Pro Glu Pro Leu Asp Trp Asp His Ala Leu Gly Ile Glu
 85 90 95
 Ala Ile Leu Ala Pro Tyr Phe His Leu Leu Ala Asn Asn Asp Ser Met
 100 105 110
 25 Val Asp Asp Leu Val Asp Phe Ala Arg Ser Trp Gln Pro Asp Leu Val
 115 120 125
 Leu Trp Glu Pro Thr Thr Tyr Ala Gly Ala Val Ala Ala Gln Val Thr
 130 135 140
 Gly Ala Ala His Ala Arg Val Leu Trp Gly Pro Asp Val Met Gly Ser
 30 145 150 155 160
 Ala Arg Arg Lys Phe Val Ala Leu Arg Asp Arg Gln Pro Pro Glu His
 165 170 175
 Arg Glu Asp Pro Thr Ala Glu Trp Leu Thr Trp Thr Leu Asp Arg Tyr
 180 185 190
 35 Gly Ala Ser Phe Glu Glu Glu Leu Leu Thr Gly Gln Phe Thr Ile Asp
 195 200 205
 Pro Thr Pro Pro Ser Leu Arg Leu Asp Thr Gly Leu Pro Thr Val Gly
 210 215 220
 Met Arg Tyr Val Pro Tyr Asn Gly Thr Ser Val Val Pro Asp Trp Leu
 40 225 230 235 240

Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Leu Thr Leu Gly Val Ser
 245 250 255
 Ala Arg Glu Val Leu Gly Gly Asp Gly Val Ser Gln Gly Asp Ile Leu
 260 265 270
 5 Glu Ala Leu Ala Asp Leu Asp Ile Glu Leu Val Ala Thr Leu Asp Ala
 275 280 285
 Ser Gln Arg Ala Glu Ile Arg Asn Tyr Pro Lys His Thr Arg Phe Thr
 290 295 300
 Asp Phe Val Pro Met His Ala Leu Leu Pro Ser Cys Ser Ala Ile Ile
 10 305 310 315 320
 His His Gly Gly Ala Gly Thr Tyr Ala Thr Ala Val Ile Asn Ala Val
 325 330 335
 Pro Gln Val Met Leu Ala Glu Leu Trp Asp Ala Pro Val Lys Ala Arg
 340 345 350
 15 Ala Val Ala Glu Gln Gly Ala Gly Phe Phe Leu Pro Pro Ala Glu Leu
 355 360 365
 Thr Pro Gln Ala Val Arg Asp Ala Val Val Arg Ile Leu Asp Asp Pro
 370 375 380
 Ser Val Ala Thr Ala Ala His Arg Leu Arg Glu Glu Thr Phe Gly Asp
 20 385 390 395 400
 Pro Thr Pro Ala Gly Ile Val Pro Glu Leu Glu Arg Leu Ala Ala Gln
 405 410 415
 His Arg Arg Pro Pro Ala Asp Ala Arg His
 420 425
 25
 <210> 21
 <211> 1209
 <212> DNA
 <213> Streptomyces venezuelae
 30
 <400> 21
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 gtggccgacc gtgaactcgg cacccaccc ctggagaccc gccgcattca ctggatccac 120
 gccgcgaacg gcgacccgta cgccaccgtg ctgcgcggcc aggcggacga cccgtatccc 180
 35 gcgtacgagc gggtgctgc cccggcgcg ctctccttca gcccacggg cagctggtc 240
 accggccatc acgccttggc ggcgagcatc ctctgtcga cggacttcgg ggtctccggc 300
 gccgacggcg tcccggtgcc gcagcagggtc ctctgtacg gggagggctg tccgctggag 360
 cgcgagcagg tgctgcccgc ggccgggtgac gtgccggagg gcccggcagcg tgccgtggtc 420
 gagggggatcc accggggagac gctgggggtt ctcgcggccgg acccggtggc gtcgtacgcc 480
 40 ttccgagctgc tgggggggtt cgtccggccgg gccgtgacgg ccgctgcccgc cgccgtgctg 540

| | | | | | | | |
|-------------|-------------|------------|------------|------------|------------|------------|------|
| ggtgttcccc | cggaccggcg | cgcggacttc | gcggatctgc | tggagcggct | ccggccgctg | 600 | |
| tccgacagcc | tgctggcccc | gcagtccctg | cggacggta | ggcggcgga | cggcgcgctg | 660 | |
| gccgagctca | cggcgctgct | cggcattcg | gacgactccc | ccggggccct | gctgtcgcg | 720 | |
| ctcggggta | ccgcagccgt | ccagctcacc | gggaacgcgg | tgctcgct | cctcgccat | 780 | |
| 5 | cccgagcagt | ggcgggagct | gtgcgaccgg | cccggtctcg | cggcggccgc | 840 | |
| accctccgct | acgaccggcc | ggtcagctc | gacgcccggg | tggtccgccc | ggagacggag | 900 | |
| ctggcgggccc | ggcggctgccc | ggccggggcg | catgtcgctg | tcctgaccgc | cgcgaccggc | 960 | |
| cgggaccggg | aggcttcac | ggaccggag | cgcttcgacc | tgcgcgcggc | cgacgcccgc | 1020 | |
| gcccaccccg | cgctgcaccc | cgccggtccc | tacggcccg | tggcgtccct | ggtccggctt | 1080 | |
| 10 | caggcggagg | tcgcgctgct | gaccctggcc | gggcgttcc | ccgggctgct | gcaggcgggg | 1140 |
| gacgtgctcc | gcccccgccg | cgcgcctgtc | ggccgcgggc | cgctgagcgt | cccggtcagc | 1200 | |
| agtcctga | | | | | | 1209 | |

<210> 22
 15 <211> 402
 <212> PRT
 <213> Streptomyces venezuelae

<400> 22
 20 Met Thr Asp Asp Leu Thr Gly Ala Leu Thr Gln Pro Pro Leu Gly Arg
 1 5 10 15
 Thr Val Arg Ala Val Ala Asp Arg Glu Leu Gly Thr His Leu Leu Glu
 20 25 30
 Thr Arg Gly Ile His Trp Ile His Ala Ala Asn Gly Asp Pro Tyr Ala
 25 35 40 45
 Thr Val Leu Arg Gly Gln Ala Asp Asp Pro Tyr Pro Ala Tyr Glu Arg
 50 55 60
 Val Arg Ala Arg Gly Ala Leu Ser Phe Ser Pro Thr Gly Ser Trp Val
 65 70 75 80
 30 Thr Ala Asp His Ala Leu Ala Ala Ser Ile Leu Cys Ser Thr Asp Phe
 85 90 95
 Gly Val Ser Gly Ala Asp Gly Val Pro Val Pro Gln Gln Val Leu Ser
 100 105 110
 Tyr Gly Glu Gly Cys Pro Leu Glu Arg Glu Gln Val Leu Pro Ala Ala
 35 115 120 125
 Gly Asp Val Pro Glu Gly Gly Gln Arg Ala Val Val Glu Gly Ile His
 130 135 140
 Arg Glu Thr Leu Glu Gly Leu Ala Pro Asp Pro Ser Ala Ser Tyr Ala
 145 150 155 160
 40 Phe Glu Leu Leu Gly Gly Phe Val Arg Pro Ala Val Thr Ala Ala

| | 165 | 170 | 175 |
|---|-----|-----|-----|
| Ala Ala Val Leu Gly Val Pro Ala Asp Arg Arg Ala Asp Phe Ala Asp | | | |
| 180 | 185 | 190 | |
| Leu Leu Glu Arg Leu Arg Pro Leu Ser Asp Ser Leu Leu Ala Pro Gln | | | |
| 5 195 | 200 | 205 | |
| Ser Leu Arg Thr Val Arg Ala Ala Asp Gly Ala Leu Ala Glu Leu Thr | | | |
| 210 | 215 | 220 | |
| Ala Leu Leu Ala Asp Ser Asp Asp Ser Pro Gly Ala Leu Leu Ser Ala | | | |
| 225 | 230 | 235 | 240 |
| 10 Leu Gly Val Thr Ala Ala Val Gln Leu Thr Gly Asn Ala Val Leu Ala | | | |
| 245 | 250 | 255 | |
| Leu Leu Ala His Pro Glu Gln Trp Arg Glu Leu Cys Asp Arg Pro Gly | | | |
| 260 | 265 | 270 | |
| Leu Ala Ala Ala Val Glu Glu Thr Leu Arg Tyr Asp Pro Pro Val | | | |
| 15 275 | 280 | 285 | |
| Gln Leu Asp Ala Arg Val Val Arg Gly Glu Thr Glu Leu Ala Gly Arg | | | |
| 290 | 295 | 300 | |
| Arg Leu Pro Ala Gly Ala His Val Val Val Leu Thr Ala Ala Thr Gly | | | |
| 305 | 310 | 315 | 320 |
| 20 Arg Asp Pro 'Glu Val Phe Thr Asp Pro Glu Arg Phe Asp Leu Ala Arg | | | |
| 325 | 330 | 335 | |
| Pro Asp Ala Ala Ala His Leu Ala Leu His Pro Ala Gly Pro Tyr Gly | | | |
| 340 | 345 | 350 | |
| Pro Val Ala Ser Leu Val Arg Leu Gln Ala Glu Val Ala Leu Arg Thr | | | |
| 25 355 | 360 | 365 | |
| Leu Ala Gly Arg Phe Pro Gly Leu Arg Gln Ala Gly Asp Val Leu Arg | | | |
| 370 | 375 | 380 | |
| Pro Arg Arg Ala Pro Val Gly Arg Gly Pro Leu Ser Val Pro Val Ser | | | |
| 385 | 390 | 395 | 400 |
| 30 Ser Ser | | | |

<210> 23

<211> 2430

35 <212> DNA

<213> *Streptomyces venezuelae*

<400> 23

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40 accctggccg tcgtcgac cctgctggcg ggcaccacccg tggcggccgc cgctcccgcc

60

120

| | | | | | | | | | | | | | | | |
|------------|------------|-------------|-----------|----------|------------|------------|--------|------------|-----|--------|----|---------|--------|------|------|
| gcccggaca | cggccaatgt | tca | gtacacg | agccgggg | cg | ga | gctcg | cgcccagatg | 180 | | | | | | |
| acgctcgacg | agaagatcag | cttcgtccac | tgggcgtgg | acccc | gaccg | gcagaacgtc | 240 | | | | | | | | |
| ggctaccc | ccggcgtgcc | gcgtctggg | atcccgg | gagc | tgctgcgc | cgacggcccg | 300 | | | | | | | | |
| aacggcatcc | gcctggtggg | gcagaccg | accgcgtgc | ccgcgc | ccgt | cgccctggcc | 360 | | | | | | | | |
| 5 | 5 | acgacacccat | ggccgac | agc | tacggcaagg | tcatggccg | cgacgg | tcgc | 420 | | | | | | |
| g | g | g | g | g | g | g | g | g | 480 | | | | | | |
| g | g | g | g | g | g | g | g | g | 540 | | | | | | |
| g | g | g | g | g | g | g | g | g | 600 | | | | | | |
| g | g | g | g | g | g | g | g | g | 660 | | | | | | |
| 10 | 10 | atcgagttcc | cg | gcgttc | ga | ggcgtc | ctcc | aaggccgg | cg | gcctc | tt | catgtgt | 720 | | |
| t | t | a | a | a | a | a | a | a | a | a | a | a | 780 | | |
| c | c | c | c | c | c | c | c | c | c | c | c | c | 840 | | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | 900 | | |
| a | a | a | a | a | a | a | a | a | a | a | a | a | 960 | | |
| 15 | 15 | aacggcacgg | tcc | ccgagg | gc | ccgt | gacg | cggtcgg | agc | ggatcg | cg | ggcagat | 1020 | | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | 1080 | | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | 1140 | | |
| c | c | c | c | c | c | c | c | c | c | c | c | c | 1200 | | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | 1260 | | |
| 20 | 20 | ccactcgaca | ccat | caaggc | cc | cg | cg | gggt | gc | gt | cg | ac | gtcggt | 1320 | |
| c | c | c | c | c | c | c | c | c | c | c | c | c | c | 1380 | |
| a | a | a | a | a | a | a | a | a | a | a | a | a | a | 1440 | |
| c | c | c | c | c | c | c | c | c | c | c | c | c | c | 1500 | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | g | 1560 | |
| 25 | 25 | accaagg | g | c | c | c | c | c | c | c | c | c | c | c | 1620 |
| c | c | c | c | c | c | c | c | c | c | c | c | c | c | 1680 | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | g | 1740 | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | g | 1800 | |
| t | t | t | t | t | t | t | t | t | t | t | t | t | t | 1860 | |
| 30 | 30 | tccaagaccc | gc | gc | gg | tc | c | tt | cg | tc | ca | cc | gg | ct | 1920 |
| g | g | g | g | g | g | g | g | g | g | g | g | g | g | 1980 | |
| c | c | c | c | c | c | c | c | c | c | c | c | c | c | 2040 | |
| c | c | c | c | c | c | c | c | c | c | c | c | c | c | 2100 | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | g | 2160 | |
| 35 | 35 | gtcgtcgta | cgt | cc | ac | gg | gg | tt | gt | ca | cc | gg | gg | aa | 2220 |
| c | c | c | c | c | c | c | c | c | c | c | c | c | c | 2280 | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | g | 2340 | |
| g | g | g | g | g | g | g | g | g | g | g | g | g | g | 2400 | |
| c | c | c | c | c | c | c | c | c | c | c | c | c | c | 2430 | |

<210> 24
 <211> 809
 <212> PRT
 <213> Streptomyces venezuelae

5

<400> 24
 Met Thr Gly Lys Thr Arg Ile Pro Arg Val Arg Arg Gly Arg Thr Thr
 1 5 10 15
 Pro Arg Ala Phe Thr Leu Ala Val Val Gly Thr Leu Leu Ala Gly Thr
 10 20 25 30
 Thr Val Ala Ala Ala Ala Pro Gly Ala Ala Asp Thr Ala Asn Val Gln
 35 40 45
 Tyr Thr Ser Arg Ala Ala Glu Leu Val Ala Gln Met Thr Leu Asp Glu
 50 55 60
 15 Lys Ile Ser Phe Val His Trp Ala Leu Asp Pro Asp Arg Gln Asn Val
 65 70 75 80
 Gly Tyr Leu Pro Gly Val Pro Arg Leu Gly Ile Pro Glu Leu Arg Ala
 85 90 95
 Ala Asp Gly Pro Asn Gly Ile Arg Leu Val Gly Gln Thr Ala Thr Ala
 20 100 105 110
 Leu Pro Ala Pro Val Ala Leu Ala Ser Thr Phe Asp Asp Thr Met Ala
 115 120 125
 Asp Ser Tyr Gly Lys Val Met Gly Arg Asp Gly Arg Ala Leu Asn Gln
 130 135 140
 25 Asp Met Val Leu Gly Pro Met Met Asn Asn Ile Arg Val Pro His Gly
 145 150 155 160
 Gly Arg Asn Tyr Glu Thr Phe Ser Glu Asp Pro Leu Val Ser Ser Arg
 165 170 175
 Thr Ala Val Ala Gln Ile Lys Gly Ile Gln Gly Ala Gly Leu Met Thr
 30 180 185 190
 Thr Ala Lys His Phe Ala Ala Asn Asn Gln Glu Asn Asn Arg Phe Ser
 195 200 205
 Val Asn Ala Asn Val Asp Glu Gln Thr Leu Arg Glu Ile Glu Phe Pro
 210 215 220
 35 Ala Phe Glu Ala Ser Ser Lys Ala Gly Ala Ala Ser Phe Met Cys Ala
 225 230 235 240
 Tyr Asn Gly Leu Asn Gly Lys Pro Ser Cys Gly Asn Asp Glu Leu Leu
 245 250 255
 Asn Asn Val Leu Arg Thr Gln Trp Gly Phe Gln Gly Trp Val Met Ser
 40 260 265 270

Asp Trp Leu Ala Thr Pro Gly Thr Asp Ala Ile Thr Lys Gly Leu Asp
 275 280 285
 Gln Glu Met Gly Val Glu Leu Pro Gly Asp Val Pro Lys Gly Glu Pro
 290 295 300
 5 Ser Pro Pro Ala Lys Phe Phe Gly Glu Ala Leu Lys Thr Ala Val Leu
 305 310 315 320
 Asn Gly Thr Val Pro Glu Ala Ala Val Thr Arg Ser Ala Glu Arg Ile
 325 330 335
 Val Gly Gln Met Glu Lys Phe Gly Leu Leu Leu Ala Thr Pro Ala Pro
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 Arg Pro Glu Arg Asp Lys Ala Gly Ala Gln Ala Val Ser Arg Lys Val
 355 360 365
 Ala Glu Asn Gly Ala Val Leu Leu Arg Asn Glu Gly Gln Ala Leu Pro
 370 375 380
 15 Leu Ala Gly Asp Ala Gly Lys Ser Ile Ala Val Ile Gly Pro Thr Ala
 385 390 395 400
 Val Asp Pro Lys Val Thr Gly Leu Gly Ser Ala His Val Val Pro Asp
 405 410 415
 Ser Ala Ala Ala Pro Leu Asp Thr Ile Lys Ala Arg Ala Gly Ala Gly
 20 420 425 430
 Ala Thr Val Thr Tyr Glu Thr Gly Glu Glu Thr Phe Gly Thr Gln Ile
 435 440 445
 Pro Ala Gly Asn Leu Ser Pro Ala Phe Asn Gln Gly His Gln Leu Glu
 450 455 460
 25 Pro Gly Lys Ala Gly Ala Leu Tyr Asp Gly Thr Leu Thr Val Pro Ala
 465 470 475 480
 Asp Gly Glu Tyr Arg Ile Ala Val Arg Ala Thr Gly Gly Tyr Ala Thr
 485 490 495
 Val Gln Leu Gly Ser His Thr Ile Glu Ala Gly Gln Val Tyr Gly Lys
 30 500 505 510
 Val Ser Ser Pro Leu Leu Lys Leu Thr Lys Gly Thr His Lys Leu Thr
 515 520 525
 Ile Ser Gly Phe Ala Met Ser Ala Thr Pro Leu Ser Leu Glu Leu Gly
 530 535 540
 35 Trp Val Thr Pro Ala Ala Ala Asp Ala Thr Ile Ala Lys Ala Val Glu
 545 550 555 560
 Ser Ala Arg Lys Ala Arg Thr Ala Val Val Phe Ala Tyr Asp Asp Gly
 565 570 575
 Thr Glu Gly Val Asp Arg Pro Asn Leu Ser Leu Pro Gly Thr Gln Asp
 40 580 585 590

Lys Leu Ile Ser Ala Val Ala Asp Ala Asn Pro Asn Thr Ile Val Val
 595 600 605
 Leu Asn Thr Gly Ser Ser Val Leu Met Pro Trp Leu Ser Lys Thr Arg
 610 615 620
 5 Ala Val Leu Asp Met Trp Tyr Pro Gly Gln Ala Gly Ala Glu Ala Thr
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 Ala Ala Leu Leu Tyr Gly Asp Val Asn Pro Ser Gly Lys Leu Thr Gln
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 Ser Phe Pro Ala Ala Glu Asn Gln His Ala Val Ala Gly Asp Pro Thr
 10 660 665 670
 Ser Tyr Pro Gly Val Asp Asn Gln Gln Thr Tyr Arg Glu Gly Ile His
 675 680 685
 Val Gly Tyr Arg Trp Phe Asp Lys Glu Asn Val Lys Pro Leu Phe Pro
 690 695 700
 15 Phe Gly His Gly Leu Ser Tyr Thr Ser Phe Thr Gln Ser Ala Pro Thr
 705 710 715 720
 Val Val Arg Thr Ser Thr Gly Gly Leu Lys Val Thr Val Thr Val Arg
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 Asn Ser Gly Lys Arg Ala Gly Gln Glu Val Val Gln Ala Tyr Leu Gly
 20 740 745 750
 Ala Ser Pro Asn Val Thr Ala Pro Gln Ala Lys Lys Lys Leu Val Gly
 755 760 765
 Tyr Thr Lys Val Ser Leu Ala Ala Gly Glu Ala Lys Thr Val Thr Val
 770 775 780
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 785 790 795 800
 Arg Gly Ser Ala Thr Val Asn Val Trp
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 <211> 9
 <212> PRT
 <213> Artificial Sequence

35 <220>
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<221> VARIANT
 <222> (4)...(4)

40 <223> Residue 4 is either V or I.

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5 <210> 26
 <211> 1011
 <212> DNA
 <213> Streptomyces venezuelae

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 gacggtagga acgttctcga aatcgcccc ggaaaggcgc cgataaccga ggagttggtg 180
 cgctccttcg acaccgtgac ggtcgtggag atggacccgc actggccgc gcatgtgcgg 240
 15 cgaaaattcg aaggggagag ggtcaccgta ttccagggtg atttcctcga cttccgcatt 300
 ccgcgcgata tcgcacccgt cgtcggaaac gttcccttcg gcatcacgac ccagattctc 360
 cggagtctcc tggaatcgac gaactggcag tcggccccc tgatagtgca gtggagggtc 420
 gcccccaaac ggcgggtcg cagcggcggc tgcctctca cgacccctcg ggccccctgg 480
 tacgagttcg cggtccacga ccgcgtccgc gcctcgatccgt tccgtccgat gccccgcgtc 540
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 cgccgccttc agaacttcgc cgaagccgtc ttacccggcc cccggacgggg cctcgccggag 660
 atccctccggc gccacatccc caagcggacc taccgttccc tcgcccaccg ccacgaaatt 720
 cccggacggcg gactgccgaa ggacccctcact ctcacccaaat ggatcgccct tttccaggcc 780
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 taegggccca cgcgcggcg cgaaccctgc gcaccccgcc cacaggtccg gcagaccaag 960
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<210> 27
 30 <211> 336
 <212> PRT
 <213> Streptomyces venezuelae

<400> 27
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 40 35 40 45

Gly Pro Gly Lys Gly Ala Ile Thr Glu Glu Leu Val Arg Ser Phe Asp
 50 55 60
 Thr Val Thr Val Val Glu Met Asp Pro His Trp Ala Ala His Val Arg
 65 70 75 80
 5 Arg Lys Phe Glu Gly Glu Arg Val Thr Val Phe Gln Gly Asp Phe Leu
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 Asp Phe Arg Ile Pro Arg Asp Ile Asp Thr Val Val Gly Asn Val Pro
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 Phe Gly Ile Thr Thr Gln Ile Leu Arg Ser Leu Leu Glu Ser Thr Asn
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 Ala Gly Arg Ser Gly Gly Ser Leu Leu Thr Thr Ser Trp Ala Pro Trp
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 15 Tyr Glu Phe Ala Val His Asp Arg Val Arg Ala Ser Ser Phe Arg Pro
 165 170 175
 Met Pro Arg Val Asp Gly Gly Val Leu Thr Ile Arg Arg Arg Pro Gln
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 Pro Leu Leu Pro Glu Ser Ala Ser Arg Ala Phe Gln Asn Phe Ala Glu
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 Ala Val Phe Thr Gly Pro Gly Arg Gly Leu Ala Glu Ile Leu Arg Arg
 210 215 220
 His Ile Pro Lys Arg Thr Tyr Arg Ser Leu Ala Asp Arg His Gly Ile
 225 230 235 240
 25 Pro Asp Gly Gly Leu Pro Lys Asp Leu Thr Leu Thr Gln Trp Ile Ala
 245 250 255
 Leu Phe Gln Ala Ser Gln Pro Ser Tyr Ala Pro Gly Ala Pro Gly Thr
 260 265 270
 Arg Met Pro Gly Gln Gly Gly Ala Gly Gly Arg Asp Tyr Asp Ser
 30 275 280 285
 Glu Thr Ser Arg Ala Ala Val Pro Gly Ser Arg Arg Tyr Gly Pro Thr
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<210> 28
 <211> 969
 40 <212> DNA

<213> Streptomyces venezuelae

<400> 28

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| | ggtccgggtg | acggcgccct | gaccctgccc | ctgagcaggc | acggcaggcc | gatcaccgccc | 180 |
| | gtcgagctcg | acggccggcg | cgcgcagcgc | ctcggtgccc | gcaccccccgg | tcatgtgacc | 240 |
| | gtgggtgaccc | acgacttcct | gcaagtacccg | ctgcccgcga | acccgcatgt | ggtcgtcgcc | 300 |
| 10 | aacgtcccct | tccatctgac | gacggcgatc | atgcggcgcc | tgctcgacgc | ccagcactgg | 360 |
| | cacacccgccc | tcctcctcg | ccagtgggag | gtcgcccgcc | gccggggccgg | cgtcgccggg | 420 |
| | tcgacgctgc | tgacggccgg | ctggggcgccc | tggtacgagt | tcgacctgca | ctcccccggc | 480 |
| | cccgcgccgg | ccttcgtcc | gatgccgggc | gtggacggag | gagtactggc | catccggcg | 540 |
| | cggtccgcgc | cgctcggtgg | ccaggtgaag | acgtaccagg | acttcgtacg | ccaggtgttc | 600 |
| | accggcaagg | ggaacgggct | gaaggagatc | ctgcggcgga | ccgggcggat | ctcgcagcg | 660 |
| 15 | gacctggcga | cctggctgcg | gaggaacgag | atctcgccgc | acgcgctgccc | caaggacctg | 720 |
| | aagccccggc | agtgggcgtc | gctgtgggag | ctgacccggcg | gcacggccga | cggatccttc | 780 |
| | gacgggtacgg | cgggcgggtgg | cgcggccgg | tcgcacgggg | cggctcggg | cggggccgg | 840 |
| | cacccggggcg | gccgggtgtc | cgcgagccgg | cggggcgtgc | cgcaggcgcg | gcgcggccgg | 900 |
| | gggcatgcgg | tacggagctc | cacggggacc | gagccgaggt | ggggcaggggg | gcggggcggag | 960 |
| 20 | agcgcgtga | | | | | | 969 |

<210> 29

<211> 322

<212> PRT

25 <213> Streptomyces venezuelae

<400> 29

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| Met | Ala | Phe | Ser | Pro | Gln | Gly | Gly | Arg | His | Glu | Leu | Gly | Gln | Asn | Phe | |
| 1 | | | | | | | | | | | | | | | 15 | |
| 30 | Leu | Val | Asp | Arg | Ser | Val | Ile | Asp | Glu | Ile | Asp | Gly | Leu | Val | Ala | Arg |
| | | | | | | | | | | | | | | | 30 | |
| | Thr | Lys | Gly | Pro | Ile | Leu | Glu | Ile | Gly | Pro | Gly | Asp | Gly | Ala | Leu | Thr |
| | | | | | | | | | | | | | | | 45 | |
| | 35 | | | | | | | | | | | | | | | |
| | Leu | Pro | Leu | Ser | Arg | His | Gly | Arg | Pro | Ile | Thr | Ala | Val | Glu | Leu | Asp |
| 35 | 50 | | | | | | | | | | | | | | 60 | |
| | Gly | Arg | Arg | Ala | Gln | Arg | Leu | Gly | Ala | Arg | Thr | Pro | Gly | His | Val | Thr |
| | 65 | | | | | | | | | | | | | | 80 | |
| | Val | Val | His | His | Asp | Phe | Leu | Gln | Tyr | Pro | Leu | Pro | Arg | Asn | Pro | His |
| | | | | | | | | | | | | | | | 95 | |
| 40 | val | Val | Val | Gly | Asn | Val | Pro | Phe | His | Leu | Thr | Thr | Ala | Ile | Met | Arg |

| | 100 | 105 | 110 |
|----|---|---------------------|-----|
| | Arg Leu Leu Asp Ala Gln His Trp His Thr Ala Val | Leu Leu Val Gln | |
| | 115 | 120 | 125 |
| | Trp Glu Val Ala Arg Arg Ala Gly Val Gly Gly Ser | Thr Leu Leu | |
| 5 | 130 | 135 | 140 |
| | Thr Ala Gly Trp Ala Pro Trp Tyr Glu Phe Asp | Leu His Ser Arg Val | |
| | 145 | 150 | 155 |
| | Pro Ala Arg Ala Phe Arg Pro Met Pro Gly Val Asp | Gly Gly Val Leu | |
| | 165 | 170 | 175 |
| 10 | Ala Ile Arg Arg Arg Ser Ala Pro Leu Val Gly Gln | Val Lys Thr Tyr | |
| | 180 | 185 | 190 |
| | Gln Asp Phe Val Arg Gln Val Phe Thr Gly Lys | Gly Asn Gly Leu Lys | |
| | 195 | 200 | 205 |
| | Glu Ile Leu Arg Arg Thr Gly Arg Ile Ser Gln Arg | Asp Leu Ala Thr | |
| 15 | 210 | 215 | 220 |
| | Trp Leu Arg Arg Asn Glu Ile Ser Pro His Ala Leu | Pro Lys Asp Leu | |
| | 225 | 230 | 235 |
| | Lys Pro Gly Gln Trp Ala Ser Leu Trp Glu Leu Thr | Gly Gly Thr Ala | |
| | 245 | 250 | 255 |
| 20 | Asp Gly Ser Phe Asp Gly Thr Ala Gly Gly Ala Ala | Gly Ser His | |
| | 260 | 265 | 270 |
| | Gly Ala Ala Arg Val Gly Ala Gly His Pro Gly Gly | Arg Val Ser Ala | |
| | 275 | 280 | 285 |
| | Ser Arg Arg Gly Val Pro Gln Ala Arg Arg Gly Arg | Gly His Ala Val | |
| 25 | 290 | 295 | 300 |
| | Arg Ser Ser Thr Gly Thr Glu Pro Arg Trp Gly Arg | Gly Arg Ala Glu | |
| | 305 | 310 | 315 |
| | Ser Ala | | 320 |
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| | <211> 13842 | | |
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| | catgcggagc actccttctc tcgtgctcct accggtgatg tgcgcgccga attgattcgt 180 | | |
| 40 | ggagagatgt cgacagtgtc caagagttag tccgaggaat tcgtgtccgt gtcgaacgac 240 | | |

| | | | | | | |
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| gcccgttccg | cgcacggcac | agcggAACCC | gtcgccgtcg | tcggcatctc | ctgcccgggtg | 300 |
| ccccggcgccc | gggaccccgag | agagttctgg | gaactcttgg | cgccaggcg | ccaggccgtc | 360 |
| accgacgtcc | ccgcggaccg | ctggAACGCC | ggcgacttct | acgacccgga | ccgctccgccc | 420 |
| ccccggccgt | cgAACAGCCG | gtggggcggg | ttcatcgagg | acgtcgaccg | gttcgacGCC | 480 |
| 5gccttcttcg | gcatctcgcc | ccgcgaggcc | gcggagatgg | acccgcagca | gcggctcgcc | 540 |
| ctggagctgg | gctgggaggc | cctggagcgc | gccgggatcg | acccgtcctc | gctcaccggc | 600 |
| acccgcaccg | gcgtcttcgc | cggcgcaccatc | tgggacgact | acgccaccct | gaagcaccgc | 660 |
| cagggcgccg | ccgcgatcac | cccgacacc | gtcaccggcc | tccaccgcgg | catcatcg | 720 |
| aaccgactct | cgtacacgct | cgggctccgc | ggccccagca | tggtcgtcga | ctccggccag | 780 |
| 10tcctctcg | tcgtcgccgt | ccacctcg | tgcgagagcc | tgccggcgccg | cgagtcccg | 840 |
| ctcgccctcg | ccggcgccgt | ctcgctcaac | ctgggtccgg | acagcatcat | cggggcgagc | 900 |
| aagttcgccg | gcctctcccc | cgacggccgc | gcctacacct | tcgacgcgcg | cgccaaacggc | 960 |
| tacgtaegcg | gcgagggcg | cggtttcgtc | gtccttaaagc | gcctctcccc | ggccgtcgcc | 1020 |
| gacggcgacc | cggtgctcg | cgtgatccgg | ggcagcgcgc | tcaacaacgg | cggcgcgcgc | 1080 |
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| cggccggga | ccgcgcggc | cgacgtcg | tacgtaegc | tgacgcgcac | cggcacccccc | 1200 |
| gtgggcgacc | cgatcgaggc | cgctgcgc | ggcgccgc | tccgcacccgg | ccgcccggcc | 1260 |
| ggacagccgc | tcctggtcgg | ctcggtcaag | acgaacatcg | gccaccttgg | ggcgcggcc | 1320 |
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| 20ctgaactacg | agaccccgaa | cccgccgatc | ccgttcgagg | aactgaacct | cggggtgaac | 1440 |
| acggagtacc | tgccgtggga | gccggagcac | gacgggcagc | ggatggtcgt | cggcgtgtcc | 1500 |
| tcgttcggca | tgggcggcac | gaacgcgc | gtcgacgc | aagaggcccc | cgggggttgt | 1560 |
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| ctggtccggg | gcgtggctc | cggtgtcg | cgagtgg | tctgttccc | cgggcagg | 1920 |
| acgcagtgg | ccggcatgg | tccgaact | ctggactt | ccgcgtgtt | cgccggcc | 1980 |
| 30atggccgaat | gcgaggccgc | actctcccc | tacgtcgact | ggtcgcgtg | ggccgtcgta | 2040 |
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| gtcctcgcc | ggctcagccc | gcaggc | gtcgacgc | tcttcgc | actcgaaaggc | 2580 |
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| | | | | | | |
|--------------|-------------|-------------|-------------|-------------|-------------|------|
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| gaggtcagcg | cccaccccg | cctcaccatg | gccctccccg | ggaccgtcac | cggctggcg | 2760 |
| accctcgctc | gcgacaacgg | cggtcaggac | cgcctagtcg | cctccctcgc | cgaagcatgg | 2820 |
| gccaacggac | tcgcggtcga | ctggagcccg | ctcctccct | ccgcgaccgg | ccaccactcc | 2880 |
| 5gacccccc | cctacgcgtt | ccagaccggag | cgccactggc | tggcgcagat | cgagggcgctc | 2940 |
| gccccggcgg | gcgagccggc | ggtgcagccc | gccgtccctcc | gcacggaggc | ggccgagccg | 3000 |
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 Ala Pro Thr Gly Asp Val Arg Ala Glu Leu Ile Arg Gly Glu Met Ser
 50 55 60
 5 Thr Val Ser Lys Ser Glu Ser Glu Glu Phe Val Ser Val Ser Asn Asp
 65 70 75 80
 Ala Gly Ser Ala His Gly Thr Ala Glu Pro Val Ala Val Val Gly Ile
 85 90 95
 Ser Cys Arg Val Pro Gly Ala Arg Asp Pro Arg Glu Phe Trp Glu Leu
 10 100 105 110
 Leu Ala Ala Gly Gly Gln Ala Val Thr Asp Val Pro Ala Asp Arg Trp
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 15 <212> PRT
 <213> Streptomyces venezuelae

<400> 33

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| 20 1 | | | | | 5 | | | 10 | | | | 15 | | | | |
| Thr | Ala | Asp | Leu | His | Glu | Ala | Arg | Gly | Arg | Leu | Arg | Glu | Leu | Ala | | |
| | | | | | 20 | | | 25 | | | | 30 | | | | |
| Lys | Ala | Gly | Glu | Pro | Val | Ala | Ile | Val | Gly | Met | Ala | Cys | Arg | Leu | Pro | |
| | | | | | 35 | | | 40 | | | | 45 | | | | |
| 25 | Gly | Gly | Val | Ala | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Ala | Gly | Gly |
| | 50 | | | | | 55 | | | | 60 | | | | | | |
| Glu | Asp | Ala | Ile | Ser | Glu | Phe | Pro | Gln | Asp | Arg | Gly | Trp | Asp | Val | Glu | |
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| Gly | Leu | Tyr | Asp | Pro | Asn | Pro | Glu | Ala | Thr | Gly | Lys | Ser | Tyr | Ala | Arg | |
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| Glu | Ala | Gly | Phe | Leu | Tyr | Glu | Ala | Gly | Glu | Phe | Asp | Ala | Asp | Phe | Phe | |
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 Tyr Thr Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys
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| | | | | | | | 20 | | | 25 | | | 30 | | | |
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| | Gly | Val | Ala | Ser | Pro | Glu | Asp | Leu | Trp | Gln | Leu | Val | Ala | Gly | Asp | Gly |
| | | | | | | | 50 | | | 55 | | | 60 | | | |
| | Asp | Ala | Ile | Ser | Glu | Phe | Pro | Gln | Asp | Arg | Gly | Trp | Asp | Val | Glu | Gly |
| | | | | | | | 65 | | | 70 | | | 75 | | | 80 |
| 30 | Leu | Tyr | Asp | Pro | Asp | Pro | Asp | Ala | Ser | Gly | Arg | Thr | Tyr | Cys | Arg | Ser |
| | | | | | | | 85 | | | 90 | | | 95 | | | |
| | Gly | Gly | Phe | Leu | His | Asp | Ala | Gly | Glu | Phe | Asp | Ala | Asp | Phe | Phe | Gly |
| | | | | | | | 100 | | | 105 | | | 110 | | | |
| | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Ser |
| 35 | | | | | | | 115 | | | 120 | | | 125 | | | |
| | Leu | Thr | Thr | Ala | Trp | Glu | Ala | Ile | Glu | Ser | Ala | Gly | Ile | Asp | Pro | Thr |
| | | | | | | | 130 | | | 135 | | | 140 | | | |
| | Ala | Leu | Lys | Gly | Ser | Gly | Leu | Gly | Val | Phe | Val | Gly | Gly | Trp | His | Thr |
| | | | | | | | 145 | | | 150 | | | 155 | | | 160 |
| 40 | Gly | Tyr | Thr | Ser | Gly | Gln | Thr | Thr | Ala | Val | Gln | Ser | Pro | Glu | Leu | Glu |

| | 165 | 170 | 175 |
|----|---|-----|-----|
| | Gly His Leu Val Ser Gly Ala Ala Leu Gly Phe Leu Ser Gly Arg Ile | | |
| | 180 | 185 | 190 |
| | Ala Tyr Val Leu Gly Thr Asp Gly Pro Ala Leu Thr Val Asp Thr Ala | | |
| 5 | 195 | 200 | 205 |
| | Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Val Gln Ala Leu Arg | | |
| | 210 | 215 | 220 |
| | Lys Gly Glu Cys Asp Met Ala Leu Ala Gly Gly Val Thr Val Met Pro | | |
| | 225 | 230 | 235 |
| | Asn Ala Asp Leu Phe Val Gln Phe Ser Arg Gln Arg Gly Leu Ala Ala | | |
| 10 | 245 | 250 | 255 |
| | Asp Gly Arg Ser Lys Ala Phe Ala Thr Ser Ala Asp Gly Phe Gly Pro | | |
| | 260 | 265 | 270 |
| | Ala Glu Gly Ala Gly Val Leu Leu Val Glu Arg Leu Ser Asp Ala Arg | | |
| 15 | 275 | 280 | 285 |
| | Arg Asn Gly His Arg Ile Leu Ala Val Val Arg Gly Ser Ala Val Asn | | |
| | 290 | 295 | 300 |
| | Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro Ser Gln | | |
| | 305 | 310 | 315 |
| | Asn Arg Val Ile Arg Arg Ala Leu Ala Asp Ala Arg Leu Ala Pro Gly | | |
| 20 | 325 | 330 | 335 |
| | Asp Val Asp Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp | | |
| | 340 | 345 | 350 |
| | Pro Ile Glu Ala Gln Ala Leu Ile Ala Thr Tyr Gly Gln Glu Lys Ser | | |
| 25 | 355 | 360 | 365 |
| | Ser Glu Gln Pro Leu Arg Leu Gly Ala Leu Lys Ser Asn Ile Gly His | | |
| | 370 | 375 | 380 |
| | Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Gln Ala | | |
| | 385 | 390 | 395 |
| | Asp Gln Ile Asp Trp Ser Ala Gly Thr Val Glu Leu Leu Thr Glu Ala | | |
| 30 | 405 | 410 | 415 |
| | Asp Val Asp Trp Pro Glu Lys Gln Asp Gly Gly Leu Arg Arg Ala Ala Val | | |
| 35 | 420 | 425 | 430 |
| | Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Glu | | |
| | 435 | 440 | 445 |
| | Ala Pro Ala Val Glu Asp Ser Pro Ala Val Glu Pro Pro Ala Gly Gly | | |
| | 450 | 455 | 460 |
| | Asn Arg Val Val Pro Trp Pro Val Ser Ala Lys Thr Pro Ala Ala Leu Asp | | |
| 40 | 465 | 470 | 475 |
| | Asn Arg Val Val Pro Trp Pro Val Ser Ala Lys Thr Pro Ala Ala Leu Asp | | |
| | 480 | | |

| | | | |
|--|-----|-----|-----|
| | 485 | 490 | 495 |
| Ala Gln Ile Gly Gln Leu Ala Ala Tyr Ala Asp Gly Arg Thr Asp Val | | | |
| 500 | 505 | 510 | |
| Asp Pro Ala Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr Ala Met | | | |
| 5 515 | 520 | 525 | |
| Glu His Arg Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu Arg Asp | | | |
| 530 | 535 | 540 | |
| Ala Leu Arg Met Pro Glu Gly Leu Val Arg Gly Thr Ser Ser Asp Val | | | |
| 545 | 550 | 555 | 560 |
| 10 Gly Arg Val Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly | | | |
| 565 | 570 | 575 | |
| Met Gly Ala Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala Ser Met | | | |
| 580 | 585 | 590 | |
| Ala Glu Cys Glu Thr Ala Leu Ser Arg Tyr Val Asp Trp Ser Leu Glu | | | |
| 15 595 | 600 | 605 | |
| Ala Val Val Arg Gln Glu Pro Gly Ala Pro Thr Leu Asp Arg Val Asp | | | |
| 610 | 615 | 620 | |
| Val Val Gln Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val | | | |
| 625 | 630 | 635 | 640 |
| 20 Trp Gln His His Gly Ile Thr Pro Gln Ala Val Val Gly His Ser Gln | | | |
| 645 | 650 | 655 | |
| Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp | | | |
| 660 | 665 | 670 | |
| Ala Ala Arg Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu | | | |
| 25 675 | 680 | 685 | |
| Ala Gly Lys Gly Gly Met Ile Ser Leu Ala Leu Asp Glu Ala Ala Val | | | |
| 690 | 695 | 700 | |
| Leu Lys Arg Leu Ser Asp Phe Asp Gly Leu Ser Val Ala Ala Val Asn | | | |
| 705 | 710 | 715 | 720 |
| 30 Gly Pro Thr Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Glu Glu | | | |
| 725 | 730 | 735 | |
| Leu Ala Arg Thr Cys Glu Ala Asp Gly Val Arg Ala Arg Ile Ile Pro | | | |
| 740 | 745 | 750 | |
| Val Asp Tyr Ala Ser His Ser Arg Gln Val Glu Ile Ile Glu Lys Glu | | | |
| 35 755 | 760 | 765 | |
| Leu Ala Glu Val Leu Ala Gly Leu Ala Pro Gln Ala Pro His Val Pro | | | |
| 770 | 775 | 780 | |
| Phe Phe Ser Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Val Leu Asp | | | |
| 785 | 790 | 795 | 800 |
| 40 Gly Thr Tyr Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro | | | |

| | | | |
|----|---|------|------|
| | 805 | 810 | 815 |
| | Ala Val Glu Thr Leu Ala Val Asp Gly Phe Thr His Phe Ile Glu Val | | |
| | 820 | 825 | 830 |
| | Ser Ala His Pro Val Leu Thr Met Thr Leu Pro Glu Thr Val Thr Gly | | |
| 5 | 835 | 840 | 845 |
| | Leu Gly Thr Leu Arg Arg Glu Gln Gly Gly Gln Glu Arg Leu Val Thr | | |
| | 850 | 855 | 860 |
| | Ser Leu Ala Glu Ala Trp Ala Asn Gly Leu Thr Ile Asp Trp Ala Pro | | |
| | 865 | 870 | 875 |
| 10 | Ile Leu Pro Thr Ala Thr Gly His His Pro Glu Leu Pro Thr Tyr Ala | | |
| | 885 | 890 | 895 |
| | Phe Gln Thr Glu Arg Phe Trp Leu Gln Ser Ser Ala Pro Thr Ser Ala | | |
| | 900 | 905 | 910 |
| | Ala Asp Asp Trp Arg Tyr Arg Val Glu Trp Lys Pro Leu Thr Ala Ser | | |
| 15 | 915 | 920 | 925 |
| | Gly Gln Ala Asp Leu Ser Gly Arg Trp Ile Val Ala Val Gly Ser Glu | | |
| | 930 | 935 | 940 |
| | Pro Glu Ala Glu Leu Leu Gly Ala Leu Lys Ala Ala Gly Ala Glu Val | | |
| | 945 | 950 | 955 |
| 20 | Asp Val Leu Glu Ala Gly Ala Asp Asp Asp Arg Glu Ala Leu Ala Ala | | |
| | 965 | 970 | 975 |
| | Arg Leu Thr Ala Leu Thr Thr Gly Asp Gly Phe Thr Gly Val Val Ser | | |
| | 980 | 985 | 990 |
| | Leu Leu Asp Asp Leu Val Pro Gln Val Ala Trp Val Gln Ala Leu Gly | | |
| 25 | 995 | 1000 | 1005 |
| | Asp Ala Gly Ile Lys Ala Pro Leu Trp Ser Val Thr Gln Gly Ala Val | | |
| | 1010 | 1015 | 1020 |
| | Ser Val Gly Arg Leu Asp Thr Pro Ala Asp Pro Asp Arg Ala Met Leu | | |
| | 1025 | 1030 | 1035 |
| 30 | Trp Gly Leu Gly Arg Val Val Ala Leu Glu His Pro Glu Arg Trp Ala | | |
| | 1045 | 1050 | 1055 |
| | Gly Leu Val Asp Leu Pro Ala Gln Pro Asp Ala Ala Ala Leu Ala His | | |
| | 1060 | 1065 | 1070 |
| | Leu Val Thr Ala Leu Ser Gly Ala Thr Gly Glu Asp Gln Ile Ala Ile | | |
| 35 | 1075 | 1080 | 1085 |
| | Arg Thr Thr Gly Leu His Ala Arg Arg Leu Ala Arg Ala Pro Leu His | | |
| | 1090 | 1095 | 1100 |
| | Gly Arg Arg Pro Thr Arg Asp Trp Gln Pro His Gly Thr Val Leu Ile | | |
| | 1105 | 1110 | 1115 |
| 40 | Thr Gly Gly Thr Gly Ala Leu Gly Ser His Ala Ala Arg Trp Met Ala | | |
| | | | 1120 |

| | | | |
|--|------|------|------|
| | 1125 | 1130 | 1135 |
| His His Gly Ala Glu His Leu Leu Leu Val Ser Arg Ser Gly Glu Gln | | | |
| | 1140 | 1145 | 1150 |
| Ala Pro Gly Ala Thr Gln Leu Thr Ala Glu Leu Thr Ala Ser Gly Ala | | | |
| 5 | 1155 | 1160 | 1165 |
| Arg Val Thr Ile Ala Ala Cys Asp Val Ala Asp Pro His Ala Met Arg | | | |
| | 1170 | 1175 | 1180 |
| Thr Leu Leu Asp Ala Ile Pro Ala Glu Thr Pro Leu Thr Ala Val Val | | | |
| | 1185 | 1190 | 1195 |
| 1200 His Thr Ala Gly Ala Pro Gly Gly Asp Pro Leu Asp Val Thr Gly Pro | | | |
| | 1205 | 1210 | 1215 |
| Glu Asp Ile Ala Arg Ile Leu Gly Ala Lys Thr Ser Gly Ala Glu Val | | | |
| | 1220 | 1225 | 1230 |
| Leu Asp Asp Leu Leu Arg Gly Thr Pro Leu Asp Ala Phe Val Leu Tyr | | | |
| 15 | 1235 | 1240 | 1245 |
| Ser Ser Asn Ala Gly Val Trp Gly Ser Gly Ser Gln Gly Val Tyr Ala | | | |
| | 1250 | 1255 | 1260 |
| Ala Ala Asn Ala His Leu Asp Ala Leu Ala Ala Arg Arg Arg Ala Arg | | | |
| | 1265 | 1270 | 1275 |
| 1280 Gly Glu Thr Ala Thr Ser Val Ala Trp Gly Leu Trp Ala Gly Asp Gly | | | |
| | 1285 | 1290 | 1295 |
| Met Gly Arg Gly Ala Asp Asp Ala Tyr Trp Gln Arg Arg Gly Ile Arg | | | |
| | 1300 | 1305 | 1310 |
| Pro Met Ser Pro Asp Arg Ala Leu Asp Glu Leu Ala Lys Ala Leu Ser | | | |
| 25 | 1315 | 1320 | 1325 |
| His Asp Glu Thr Phe Val Ala Val Ala Asp Val Asp Trp Glu Arg Phe | | | |
| | 1330 | 1335 | 1340 |
| Ala Pro Ala Phe Thr Val Ser Arg Pro Ser Leu Leu Leu Asp Gly Val | | | |
| | 1345 | 1350 | 1355 |
| 1360 Pro Glu Ala Arg Gln Ala Leu Ala Ala Pro Val Gly Ala Pro Ala Pro | | | |
| | 1365 | 1370 | 1375 |
| Gly Asp Ala Ala Val Ala Pro Thr Gly Gln Ser Ser Ala Leu Ala Ala | | | |
| | 1380 | 1385 | 1390 |
| Ile Thr Ala Leu Pro Glu Pro Glu Arg Arg Pro Ala Leu Leu Thr Leu | | | |
| 35 | 1395 | 1400 | 1405 |
| Val Arg Thr His Ala Ala Ala Val Leu Gly His Ser Ser Pro Asp Arg | | | |
| | 1410 | 1415 | 1420 |
| Val Ala Pro Gly Arg Ala Phe Thr Glu Leu Gly Phe Asp Ser Leu Thr | | | |
| | 1425 | 1430 | 1435 |
| 1440 Ala Val Gln Leu Arg Asn Gln Leu Ser Thr Val Val Gly Asn Arg Leu | | | |

| | 1445 | 1450 | 1455 |
|--|--|------|------|
| Pro Ala Thr Thr Val Phe Asp His Pro Thr Pro Ala Ala Leu Ala Ala | | | |
| 1460 | 1465 | 1470 | |
| His Leu His Glu Ala Tyr Leu Ala Pro Ala Glu Pro Ala Pro Thr Asp | | | |
| 5 1475 | 1480 | 1485 | |
| Trp Glu Gly Arg Val Arg Arg Ala Leu Ala Glu Leu Pro Leu Asp Arg | | | |
| 1490 | 1495 | 1500 | |
| Leu Arg Asp Ala Gly Val Leu Asp Thr Val Leu Arg Leu Thr Gly Ile | | | |
| 1505 | 1510 | 1515 | 1520 |
| 10 Glu Pro Glu Pro Gly Ser Gly Gly Ser Asp Gly Gly Ala Ala Asp Pro | | | |
| 1525 | 1530 | 1535 | |
| Gly Ala Glu Pro Glu Ala Ser Ile Asp Asp Leu Asp Ala Glu Ala Leu | | | |
| 1540 | 1545 | 1550 | |
| Ile Arg Met Ala Leu Gly Pro Arg Asn Thr | | | |
| 15 1555 | 1560 | | |
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| | <211> 4041 | | |
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| | gaactccgga aagagagccg tcgcggggcc gaccgtcgcc aggagcccat ggcgatcgtc | 120 | |
| 25 | ggcatgagct gccgggttcgc gggcggaaatc cggtcccccg aggacctctg ggacgcccgtc | 180 | |
| | gccgcgggca aggacctggc ctccgaggta ccggaggagc gcggtctggg catcgactcc | 240 | |
| | ctctacgacc cggtgcccg ggcgaagggc acgacgtacg tccgcaacgc cgcgttccctc | 300 | |
| | gacgacgcccgg ccggatttcga cgcggccttc ttccggatct cgccgcgcga ggcctcgcc | 360 | |
| | atggacccgc agcagcggca gtcctcgaa gcctcctggg aggtcttcga gcgccccggc | 420 | |
| 30 | atcgaccccg cgtcggtccg cggcaccgac gtcggcgtgt acgtggctg tggctaccag | 480 | |
| | gactacgcgc cggacatccg ggtcgcccccc gaaggcaccg gcggttacgt cgtcaccggc | 540 | |
| | aactcctccg ccgtggcctc cgggcgcatac gctactccc tccgcctggaa gggacccggcc | 600 | |
| | gtgaccgtgg acacggcgtg ctccctttcg ctcgtcgccc tgcacctcgc cctgaaggc | 660 | |
| | ctgcggaaacg gcgactgtc gacggcactc gtggggggcg tggccgtctt cgcgacgccc | 720 | |
| 35 | ggcgcgttca tcgagttcag cagccagcag gccatggccg ccgacggccg gaccaaggc | 780 | |
| | ttcgcctcgg cggcgacgg cctgcctgg ggcgagggcg tcgcccgtact cctcctcgaa | 840 | |
| | cggctctccg acgcgcggcg caagggccac cgggtcctgg ccgtcgtcg cggcagcgcc | 900 | |
| | atcaaccagg acggcgcgag caacggcctc acggctccgc acggcccttc ccagcagcac | 960 | |
| | ctgatccgcc aggcctggc cgacgcgcgg ctcacgtcga ggcacgtgga cgtcgtggag | 1020 | |
| 40 | ggccacggca cggggaccccg tctcgccgac ccgatcgagg cgcagggcgct gctcgccacg | 1080 | |

| | | |
|----|---|--------------------------------------|
| 10 | tacgggcagg ggcgcgcccc gggcagccg ctgcggctgg ggacgctgaa gtcgaacatc gggcacacgc aggccgcttc gggtgtcgcc ggtgtcatca agatggtgca ggctgcgc cacgggggtgc tgccgaagac cctgcacgtg gacgagccga cggaccaggt cgactggctg gccgggttcgg tcgagctgct caccgaggcc gtggactggc cggagcggcc gggccggctc | 1140 1200 1260 1320 |
| 5 | 5 cgccggggcgg gcgtctccgc ttccggcgtg ggccggacga acgcgcacgt cgccctggag gaggccccgg cggtcgagga gtccccgtcc gtcgagccgc cggccggtgg cggcggtgg ccgtggccgg tgtcccgaa gacctggcc gcactggacg cccagatcg gcagctcgcc gcatacgcgg aagacccgac ggacgtggat cccgggtgg cccggccgc cctggctgac agccgtacgg cgatggagca cccgcgcggc gcgggtggcg acagccggga ggcactgcgg | 1380 1440 1500 1560 1620 |
| 10 | 10 gacgcccgtc ggtatggcgg aaggactggta cggggcacgg tcaccgatcc gggccgggtg gcgttcgtct tccccggcca gggcacgcag tggggccggca tggggccgcgactcctcgac agctcacccg aattcgccgc cgccatggcc gaatgcgaga ccgcactctc cccgtacgac gactggtctc tcgaagccgt cgccgtacag gtcggcggc caccgacact cgaccgcgtc gacgtcgtcc agccgtcac cttcgccgtc atggctctccc tcgccaagggt ctggcagcac | 1680 1740 1800 1860 1920 |
| 15 | 15 cacggcatca ccccccggc cgtcatcgcc cactcccagg gcgagatcg cgccgcgtac gtcgccggtg ccctcaccct cgacgacgcg gtcgtgtcg tgaccctccg cagcaagtcc atcgccgccc acctcgccgg caagggccggc atgatctccc tcgcccctcag cgaggaagcc acccggcagc gcacgagaa cctccacggc ctgtcgatcg ccggcgtcaa cgggcctacc gccaccgtgg ttccggcga cccccccag atccaagaac ttgctcaggc gtgtgaggcc | 1980 2040 2100 2160 2220 |
| 20 | 20 gacggcatcc ggcacggat catccccgtc gactacgcct cccacagcgc ccacgtcgag accatcgaga acgaactcgc cgacgtcctg gcccgggtgt ccccccagac accccaggtc cccttcttct ccaccctcga aggcacctgg atcaccgaac ccgcctcga cggcgctac tggtaccgca acctccgcca tcgtgtggc ttccggccgg ccgtcgagac cctcgccacc gacgaaggct tcaccctact catcgaggtc agcgcaccacc ccgtcctcac catgaccctc | 2280 2340 2400 2460 2520 |
| 25 | 25 cccgacaagg tcaccggcct ggccaccctc cgacgcgagg acggcggaca gcaccgcctc accacctccc ttggcgaggc ctgggccaac ggccctcgccc tcgactggc ctccctcctg cccgccacgg ggcgcctcag cccgcgcgtc cccgacactcc cgacgtacgc cttccagcac cgctcgtaact ggatcagccc cgccgggtccc ggccgaggccgc ccgcgcacac cgcttccggg cgccgaggccgc tcgcccggagac ggggtcgcg tggggccgg gtgcccggagga cctcgacgag | 2580 2640 2700 2760 2820 |
| 30 | 30 gaggggccggc gcagcgcgt actcgatg gtatgcggc aggccgcctc cgtctccgg tgcgactcgcc cgcgaaaggat ccccgatcgac cgccgcgtgc gggagatcggttctcg ctgaccgcggc tcgacttccg caaccgcgtc aaccgcgtca cccgtctcca gtcgcgcggc accgtcgatgt tccagcaccgc gacgcgcgtc ggcgcgcgc agcgcacatcg cgacgagctg gccgagcggaa actggggccgt cgccgaggccgc tcggatcaccg agcaggccggaa ggaggagaag | 2880 2940 3000 3060 3120 |
| 35 | 35 gccgcgcgtc cggcgggggc cccgtccggg gccgcacaccg ggcgcggccgc cggatgttc cgccgcgttgc tccggcaggc cgtggaggac gacccgtacg ggcgcgttgc cgcgtccctc gccgcgcgttgc cccgcgttgc cccgcgttgc gtcgcgcggc aggccgtctc ggagcggctc gaccgggtgc tgcgcgcggc cggccggcgc gacccggccgg aaggccgtgc cgttctcgac ggctgcacccg gcaccgcggc gaacggccggc ccgcacgcgt tcctgcggct cagcacctcc | 3180 3240 3300 3360 3420 |
| 40 | 40 ttccaggagg agcgggactt cctcgccgtc cctctcccg gtcacggcact gggtaacgggc | 3480 |

| | | | | | | | |
|------------|-------------|-------------|------------|------------|------------|------------|------|
| accggcacgg | ccctcctccc | ggcccgatctc | gacaccgcgc | tcgacgcccc | ggcccggcg | 3540 | |
| atcctccggg | ccgccccggga | cgccccggtc | gtcctgctcg | ggcactccgg | cggcgccctg | 3600 | |
| ctcgccacg | agctggcctt | ccgcctggag | cgggcgcacg | gcccggccgc | ggccgggatc | 3660 | |
| gtcctggtcg | accctatacc | gccgggccat | caggagccca | tcgaggtgtg | gagcaggcag | 3720 | |
| 5 | ctgggcgagg | gcctgttcgc | gggcgagctg | gagccgatgt | ccgatgcgcg | gctgctggcc | 3780 |
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| | cttctggtcc | gtgcctccga | accgctgggc | gactggcagg | aggagcgggg | cgactggcgt | 3900 |
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| | cgggaccacg | cgccggccgt | cgccgaggcc | gtcctctcct | ggctcgacgc | 4020 | |
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15 <213> *Streptomyces venezuelae*

<400> 37

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Arg Gln Glu Pro Met Ala Ile Val Gly Met Ser Cys Arg Phe Ala Gly
35 40 45

Gly Ile Arg Ser Pro Glu Asp Leu Trp Asp Ala Val Ala Ala Gly Lys
 25 50 55 60

Asp Leu Val Ser Glu Val Pro Glu Glu Arg Gly Trp Asp Ile Asp Ser
65 70 75 80

Leu Tyr Asp Pro Val Pro Gly Arg Lys Gly Thr Thr Tyr Val Arg Asn
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Ala Ala Phe Leu Asp Asp Ala Ala Gly Phe Asp Ala Ala Phe Phe Gly
100 105 110

Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Gln Leu
 115 120 125

Leu Glu Ala Ser Trp Glu Val Phe Glu Arg Ala Gly Ile Asp Pro Ala
130 135 140

Ser Val Arg Gly Thr Asp Val Gly Val Tyr Val Gly Cys Gly Tyr Gln
 145 150 155 160

Asp Tyr Ala Pro Asp Ile Arg Val Ala Pro Glu Gly Thr Gly Gly Tyr
165 170 175

40 Val Val Thr Gly Asn Ser Ser Ala Val Ala Ser Gly Arg Ile Ala Tyr

| | | |
|--|-----|-----|
| 180 | 185 | 190 |
| Ser Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser | | |
| 195 | 200 | 205 |
| Ser Ser Leu Val Ala Leu His Leu Ala Leu Lys Gly Leu Arg Asn Gly | | |
| 5 210 | 215 | 220 |
| Asp Cys Ser Thr Ala Leu Val Gly Gly Val Ala Val Leu Ala Thr Pro | | |
| 225 | 230 | 235 |
| 240 | | |
| Gly Ala Phe Ile Glu Phe Ser Ser Gln Gln Ala Met Ala Ala Asp Gly | | |
| 245 | 250 | 255 |
| 10 Arg Thr Lys Gly Phe Ala Ser Ala Ala Asp Gly Leu Ala Trp Gly Glu | | |
| 260 | 265 | 270 |
| Gly Val Ala Val Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg Arg Lys | | |
| 275 | 280 | 285 |
| Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Ile Asn Gln Asp | | |
| 15 290 | 295 | 300 |
| Gly Ala Ser Asn Gly Leu Thr Ala Pro His Gly Pro Ser Gln Gln His | | |
| 305 | 310 | 315 |
| 320 | | |
| Leu Ile Arg Gln Ala Leu Ala Asp Ala Arg Leu Thr Ser Ser Asp Val | | |
| 325 | 330 | 335 |
| 20 Asp Val Val Glu Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile | | |
| 340 | 345 | 350 |
| Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Gly Arg Ala Pro Gly | | |
| 355 | 360 | 365 |
| Gln Pro Leu Arg Leu Gly Thr Leu Lys Ser Asn Ile Gly His Thr Gln | | |
| 25 370 | 375 | 380 |
| Ala Ala Ser Gly Val Ala Gly Val Ile Lys Met Val Gln Ala Leu Arg | | |
| 385 | 390 | 395 |
| 400 | | |
| His Gly Val Leu Pro Lys Thr Leu His Val Asp Glu Pro Thr Asp Gln | | |
| 405 | 410 | 415 |
| 30 Val Asp Trp Ser Ala Gly Ser Val Glu Leu Leu Thr Glu Ala Val Asp | | |
| 420 | 425 | 430 |
| Trp Pro Glu Arg Pro Gly Arg Leu Arg Arg Ala Gly Val Ser Ala Phe | | |
| 435 | 440 | 445 |
| Gly Val Gly Gly Thr Asn Ala His Val Val Leu Glu Glu Ala Pro Ala | | |
| 35 450 | 455 | 460 |
| Val Glu Glu Ser Pro Ala Val Glu Pro Pro Ala Gly Gly Val Val | | |
| 465 | 470 | 475 |
| 480 | | |
| Pro Trp Pro Val Ser Ala Lys Thr Ser Ala Ala Leu Asp Ala Gln Ile | | |
| 485 | 490 | 495 |
| 40 Gly Gln Leu Ala Ala Tyr Ala Glu Asp Arg Thr Asp Val Asp Pro Ala | | |

| | 500 | 505 | 510 |
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| | Val Ala Ala Arg Ala Leu Val Asp Ser Arg Thr Ala Met Glu His Arg | | |
| | 515 | 520 | 525 |
| | Ala Val Ala Val Gly Asp Ser Arg Glu Ala Leu Arg Asp Ala Leu Arg | | |
| 5 | 530 | 535 | 540 |
| | Met Pro Glu Gly Leu Val Arg Gly Thr Val Thr Asp Pro Gly Arg Val | | |
| | 545 | 550 | 555 |
| | Ala Phe Val Phe Pro Gly Gln Gly Thr Gln Trp Ala Gly Met Gly Ala | | |
| | 565 | 570 | 575 |
| 10 | Glu Leu Leu Asp Ser Ser Pro Glu Phe Ala Ala Ala Met Ala Glu Cys | | |
| | 580 | 585 | 590 |
| | Glu Thr Ala Leu Ser Pro Tyr Val Asp Trp Ser Leu Glu Ala Val Val | | |
| | 595 | 600 | 605 |
| | Arg Gln Ala Pro Ser Ala Pro Thr Leu Asp Arg Val Asp Val Val Gln | | |
| 15 | 610 | 615 | 620 |
| | Pro Val Thr Phe Ala Val Met Val Ser Leu Ala Lys Val Trp Gln His | | |
| | 625 | 630 | 635 |
| | His Gly Ile Thr Pro Glu Ala Val Ile Gly His Ser Gln Gly Glu Ile | | |
| | 645 | 650 | 655 |
| 20 | Ala Ala Ala Tyr Val Ala Gly Ala Leu Thr Leu Asp Asp Ala Ala Arg | | |
| | 660 | 665 | 670 |
| | Val Val Thr Leu Arg Ser Lys Ser Ile Ala Ala His Leu Ala Gly Lys | | |
| | 675 | 680 | 685 |
| | Gly Gly Met Ile Ser Leu Ala Leu Ser Glu Glu Ala Thr Arg Gln Arg | | |
| 25 | 690 | 695 | 700 |
| | Ile Glu Asn Leu His Gly Leu Ser Ile Ala Ala Val Asn Gly Pro Thr | | |
| | 705 | 710 | 715 |
| | Ala Thr Val Val Ser Gly Asp Pro Thr Gln Ile Gln Glu Leu Ala Gln | | |
| | 725 | 730 | 735 |
| 30 | Ala Cys Glu Ala Asp Gly Ile Arg Ala Arg Ile Ile Pro Val Asp Tyr | | |
| | 740 | 745 | 750 |
| | Ala Ser His Ser Ala His Val Glu Thr Ile Glu Asn Glu Leu Ala Asp | | |
| | 755 | 760 | 765 |
| | Val Leu Ala Gly Leu Ser Pro Gln Thr Pro Gln Val Pro Phe Phe Ser | | |
| 35 | 770 | 775 | 780 |
| | Thr Leu Glu Gly Thr Trp Ile Thr Glu Pro Ala Leu Asp Gly Gly Tyr | | |
| | 785 | 790 | 795 |
| | Trp Tyr Arg Asn Leu Arg His Arg Val Gly Phe Ala Pro Ala Val Glu | | |
| | 805 | 810 | 815 |
| 40 | Thr Leu Ala Thr Asp Glu Gly Phe Thr His Phe Ile Glu Val Ser Ala | | |

| | 820 | 825 | 830 |
|----|--|------|------|
| | His Pro Val Leu Thr Met Thr Leu Pro Asp Lys Val Thr Gly Leu Ala | | |
| 5 | 835 | 840 | 845 |
| | Thr Leu Arg Arg Glu Asp Gly Gly Gln His Arg Leu Thr Thr Ser Leu | | |
| | 850 | 855 | 860 |
| | Ala Glu Ala Trp Ala Asn Gly Leu Ala Leu Asp Trp Ala Ser Leu Leu | | |
| | 865 | 870 | 875 |
| | Pro Ala Thr Gly Ala Leu Ser Pro Ala Val Pro Asp Leu Pro Thr Tyr | | |
| | 885 | 890 | 895 |
| 10 | Ala Phe Gln His Arg Ser Tyr Trp Ile Ser Pro Ala Gly Pro Gly Glu | | |
| | 900 | 905 | 910 |
| | Ala Pro Ala His Thr Ala Ser Gly Arg Glu Ala Val Ala Glu Thr Gly | | |
| | 915 | 920 | 925 |
| | Leu Ala Trp Gly Pro Gly Ala Glu Asp Leu Asp Glu Glu Gly Arg Arg | | |
| 15 | 930 | 935 | 940 |
| | Ser Ala Val Leu Ala Met Val Met Arg Gln Ala Ala Ser Val Leu Arg | | |
| | 945 | 950 | 955 |
| | Cys Asp Ser Pro Glu Glu Val Pro Val Asp Arg' Pro Leu Arg Glu Ile | | |
| | 965 | 970 | 975 |
| 20 | Gly Phe Asp Ser Leu Thr Ala Val Asp Phe Arg Asn Arg Val Asn Arg | | |
| | 980 | 985 | 990 |
| | Leu Thr Gly Leu Gln Leu Pro Pro Thr Val Val Phe Gln His Pro Thr | | |
| | 995 | 1000 | 1005 |
| | Pro Val Ala Leu Ala Glu Arg Ile Ser Asp Glu Leu Ala Glu Arg Asn | | |
| 25 | 1010 | 1015 | 1020 |
| | Trp Ala Val Ala Glu Pro Ser Asp His Glu Gln Ala Glu Glu Glu Lys | | |
| | 1025 | 1030 | 1035 |
| | Ala Ala Ala Pro Ala Gly Ala Arg Ser Gly Ala Asp Thr Gly Ala Gly | | |
| | 1045 | 1050 | 1055 |
| 30 | Ala Gly Met Phe Arg Ala Leu Phe Arg Gln Ala Val Glu Asp Asp Arg | | |
| | 1060 | 1065 | 1070 |
| | Tyr Gly Glu Phe Leu Asp Val Leu Ala Glu Ala Ser Ala Phe Arg Pro | | |
| | 1075 | 1080 | 1085 |
| | Gln Phe Ala Ser Pro Glu Ala Cys Ser Glu Arg Leu Asp Pro Val Leu | | |
| 35 | 1090 | 1095 | 1100 |
| | Leu Ala Gly Gly Pro Thr Asp Arg Ala Glu Gly Arg Ala Val Leu Val | | |
| | 1105 | 1110 | 1115 |
| | Gly Cys Thr Gly Thr Ala Ala Asn Gly Gly Pro His Glu Phe Leu Arg | | |
| | 1125 | 1130 | 1135 |
| 40 | Leu Ser Thr Ser Phe Gln Glu Glu Arg Asp Phe Leu Ala Val Pro Leu | | |

| | | | |
|----|--|------|------|
| | 1140 | 1145 | 1150 |
| | Pro Gly Tyr Gly Thr Gly Thr Gly Thr Ala Leu Leu Pro Ala | | |
| | 1155 | 1160 | 1165 |
| | Asp Leu Asp Thr Ala Leu Asp Ala Gln Ala Arg Ala Ile Leu Arg Ala | | |
| 5 | 1170 | 1175 | 1180 |
| | Ala Gly Asp Ala Pro Val Val Leu Leu Gly His Ser Gly Gly Ala Leu | | |
| | 1185 | 1190 | 1195 |
| | Leu Ala His Glu Leu Ala Phe Arg Leu Glu Arg Ala His Gly Ala Pro | | |
| | 1205 | 1210 | 1215 |
| 10 | Pro Ala Gly Ile Val Leu Val Asp Pro Tyr Pro Pro Gly His Gln Glu | | |
| | 1220 | 1225 | 1230 |
| | Pro Ile Glu Val Trp Ser Arg Gln Leu Gly Glu Gly Leu Phe Ala Gly | | |
| | 1235 | 1240 | 1245 |
| | Glu Leu Glu Pro Met Ser Asp Ala Arg Leu Leu Ala Met Gly Arg Tyr | | |
| 15 | 1250 | 1255 | 1260 |
| | Ala Arg Phe Leu Ala Gly Pro Arg Pro Gly Arg Ser Ser Ala Pro Val | | |
| | 1265 | 1270 | 1275 |
| | Leu Leu Val Arg Ala Ser Glu Pro Leu Gly Asp Trp Gln Glu Glu Arg | | |
| | 1285 | 1290 | 1295 |
| 20 | Gly Asp Trp Arg Ala His Trp Asp Leu Pro His Thr Val Ala Asp Val | | |
| | 1300 | 1305 | 1310 |
| | Pro Gly Asp His Phe Thr Met Met Arg Asp His Ala Pro Ala Val Ala | | |
| | 1315 | 1320 | 1325 |
| | Glu Ala Val Leu Ser Trp Leu Asp Ala Ile Glu Gly Ile Glu Gly Ala | | |
| 25 | 1330 | 1335 | 1340 |
| | Gly Lys | | |
| | 1345 | | |
| | <210> 38 | | |
| 30 | <211> 1251 | | |
| | <212> DNA | | |
| | <213> Streptomyces venezuelae | | |
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| 35 | gtgcggcgta cccagcaggaa aacgaccgct tctcccccgg tactcgaccc cggggccctg | 60 | |
| | gggcaggatt tcgcggccga tccgtatccg acgtacgcga gactgcgtgc cgagggtccg | 120 | |
| | gcccacccggg tgcgccaccccg cgagggggac gaggtgtggc tggtcgtcgg ctacgaccgg | 180 | |
| | gcgcgggcgg tcctcgccga tccccggttc agcaaggact ggcgcaactc cacgactccc | 240 | |
| | ctgaccgagg ccgaggccgc gotcaaccac aacatgctgg agtccgaccc gccgcggcac | 300 | |
| 40 | acccggctgc gcaagctggt ggcccgtagt ttcaccatgc gccgggtcga gttgctgcgg | 360 | |

| | | | | | | | |
|-------------|-------------|--------------|-------------|------------|------------|------------|------|
| ccccgggtcc | aggagatcgt | cgacgggctc | gtggacgcca | tgctggcggc | gccccacggc | 420 | |
| cgcggccgatc | tgatggagtc | cctggcctgg | ccgctgcccga | tcaccgtat | ctccgaactc | 480 | |
| ctcgccgtgc | ccgagccgga | ccggccgcgc | ttccgcgtct | ggaccgacgc | cttcgttcc | 540 | |
| ccggacgatc | ccgcccaggc | ccagaccgccc | atggccgaga | tgagcggcta | tctctcccg | 600 | |
| 5 | ctcatcgact | ccaagcgcgg | gcaggacggc | gaggacctgc | tcagcgcgt | cgtgcggacc | 660 |
| agcgacgagg | acggctcccg | gctgacacctcc | gaggagctgc | tcggtatggc | ccacatcctg | 720 | |
| ctcgccgtgc | ggcacgagac | cacggtaat | ctgatcgcaca | acggcatgt | cgcgctgctc | 780 | |
| tcgcaccccg | accagctggc | cgccctgcgg | gccgacatga | cgctcttgg | cggcgcggtg | 840 | |
| gaggagatgt | tgcgctacga | gggccccggtg | gaatccgcga | cctaccgctt | cccggtcgag | 900 | |
| 10 | cccgctcgacc | tggacggcac | ggtcatcccg | gccggtgaca | cggtcctcg | cgtcctggcc | 960 |
| gacgccccacc | gcaccccccga | gcgcttcccg | gacccgcacc | gcttcgacat | ccgcccggac | 1020 | |
| accggccggcc | atctcgccctt | cggccacggc | atccacttct | gcatcgccgc | cccttggcc | 1080 | |
| cggtgtggagg | cccgatcg | cgtccgcgc | cttctcgaaac | gctgcccgg | cctcgccctg | 1140 | |
| gacgtctccc | ccggcgaact | cgtgtggtat | ccgaacccga | tgatcgccgg | gctcaaggcc | 1200 | |
| 15 | ctgcgcgatcc | gctggcggcg | aggacgggag | gccccccgc | gtaccgggtt | a | 1251 |

<210> 39

<211> 416

<212> PRT

20 <213> *Streptomyces venezuelae*

<400> 39

Met Arg Arg Thr Gln Gln Gly Thr Thr Ala Ser Pro Pro Val Leu Asp

1 5 10 15

25 Leu Gly Ala Leu Gly Gln Asp Phe Ala Ala Asp Pro Tyr Pro Thr Tyr

20 25 30

Ala Arg Leu Arg Ala Glu Gly Pro Ala His Arg Val Arg Thr Pro Glu

35 40 45

Gly Asp Glu Val Trp Leu Val Val Gly Tyr Asp Arg Ala Arg Ala Val

50 55 60

Leu Ala Asp Pro Arg Phe Ser Lys Asp Trp Arg Asn Ser Thr Thr Pro

Leu Thr Glu Ala Glu Ala Ala Leu Asn His Asn Met Leu Glu Ser Asp

Pro Pro Arg His Thr Arg Leu Arg Lys Leu Val Ala Arg Glu Phe Thr

100 105 110

Met Arg Arg Val Glu Leu Leu Arg His Arg Val Glu Val Ile Val His

City, Bed, var. *Asp* and *Asp* Bed and *Asp* Top, 1000 ft. 1

Met Glu Ser Leu Ala Trp Pro Leu Pro Ile Thr Val Ile Ser Glu Leu
 145 150 155 160
 Leu Gly Val Pro Glu Pro Asp Arg Ala Ala Phe Arg Val Trp Thr Asp
 165 170 175
 5 Ala Phe Val Phe Pro Asp Asp Pro Ala Gln Ala Gln Thr Ala Met Ala
 180 185 190
 Glu Met Ser Gly Tyr Leu Ser Arg Leu Ile Asp Ser Lys Arg Gly Gln
 195 200 205
 Asp Gly Glu Asp Leu Leu Ser Ala Leu Val Arg Thr Ser Asp Glu Asp
 10 210 215 220
 Gly Ser Arg Leu Thr Ser Glu Glu Leu Leu Gly Met Ala His Ile Leu
 225 230 235 240
 Leu Val Ala Gly His Glu Thr Thr Val Asn Leu Ile Ala Asn Gly Met
 245 250 255
 15 Tyr Ala Leu Leu Ser His Pro Asp Gln Leu Ala Ala Leu Arg Ala Asp
 260 265 270
 Met Thr Leu Leu Asp Gly Ala Val Glu Glu Met Leu Arg Tyr Glu Gly
 275 280 285
 Pro Val Glu Ser Ala Thr Tyr Arg Phe Pro Val Glu Pro Val Asp Leu
 20 290 295 300
 Asp Gly Thr Val Ile Pro Ala Gly Asp Thr Val Leu Val Val Leu Ala
 305 310 315 320
 Asp Ala His Arg Thr Pro Glu Arg Phe Pro Asp Pro His Arg Phe Asp
 325 330 335
 25 Ile Arg Arg Asp Thr Ala Gly His Leu Ala Phe Gly His Gly Ile His
 340 345 350
 Phe Cys Ile Gly Ala Pro Leu Ala Arg Leu Glu Ala Arg Ile Ala Val
 355 360 365
 Arg Ala Leu Leu Glu Arg Cys Pro Asp Leu Ala Leu Asp Val Ser Pro
 30 370 375 380
 Gly Glu Leu Val Trp Tyr Pro Asn Pro Met Ile Arg Gly Leu Lys Ala
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 Leu Pro Ile Arg Trp Arg Arg Gly Arg Glu Ala Gly Arg Arg Thr Gly
 405 410 415
 35
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 <211> 2787
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 <213> Streptomyces venezuelae

<400> 40

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| atgaatctgg | tggaacgcga | cggggagata | gccccatctca | ggggcggttct | tgacgcacatcc | 60 | |
| gccgcagggt | acggggacgct | cttactctgtc | tccggaccgg | ccggcagcgg | gaagacggag | 120 | |
| ctgctgcgg | cgctccgcgg | gctggccgccc | gagcgggaga | cccccgctg | gtcggtccgg | 180 | |
| 5 | gcgctgcggg | gtgaccgcga | cattccccctg | ggcgtcctct | gccagttact | ccgcagcgcc | 240 |
| gaacaacacg | gtgccgacac | ctccgcgcgtc | cgcgacactgc | tggacgcccgc | ctcgccggcgg | 300 | |
| gccggaaacc | tcacccccc | cgccgcacgcg | ccgctccgcg | tgcacgagac | acaccgcctg | 360 | |
| cacgactgge | tgctctccgt | ctcccgccgc | accccggttc | tgcacgagac | acaccgcctg | 420 | |
| acccacgcgg | acaccgcgtc | cctgaggttc | ctccgtact | gcccgcggca | ccacgaccag | 480 | |
| 10 | ggcggcatcg | gcttcgtcat | gaccgagcgg | gcctcgacgc | gcccggata | ccgggtgttc | 540 |
| cgcgccgac | tgctccgcga | gccgcactgc | cgcaacatgt | ggctctccgg | gcttccccc | 600 | |
| agcgggtac | gccagttact | cgcccactac | tacggccccc | aggccgcga | gcccgcggcc | 660 | |
| cccgcttacc | acgcgcacgc | cggcgggaac | ccgctgtcc | tgcggggcgct | gaccaggac | 720 | |
| cggcagggct | cccacaccac | cctcggcgcg | gcccggggcg | acgagcccgt | ccacggcgac | 780 | |
| 15 | gcctcgccc | aggccgtct | cgactgcctg | caccgcacgc | ccgaggggcac | actggagacc | 840 |
| gcccgtggc | tcgcggctct | cgaacagtcc | gaccgcgtcc | tggtgagcg | gctcacggga | 900 | |
| acgaccgcgg | ccgcccgtcga | gcccacatc | caggagctcg | ccgcacatcg | cctcctggac | 960 | |
| gaggacggca | ccctgggaca | gcccgcgatc | cgcgaggccg | ccctccagga | cctgcggcc | 1020 | |
| ggcgagcgca | ccgaactgca | ccggcgcgc | gcccgcgc | tgacccggga | cgccgcgcac | 1080 | |
| 20 | gaggacaccg | tggccgcaca | cctgctggtc | ggcggccccc | ccgacgctcc | ctggcgctg | 1140 |
| cccccgtctg | aacggggcgc | gcagcaggcc | ctgttcgacg | accgactcga | cgacgccttc | 1200 | |
| cgatccctcg | agttcgccgt | gcccgtcgac | accgacaaca | cccaactggc | ccgcctcgcc | 1260 | |
| ccacacctgg | tcgcggcctc | ctggcggatg | aaccgcaca | tgacgacccg | ggccctcgca | 1320 | |
| ctcttcgacc | ggctctcgag | cggtaactg | ccgcccagcc | accggctcat | ggccctgatc | 1380 | |
| 25 | cgctgcctcg | tctggtaacgg | gcccgtgc | gaggccgcgg | acgcgcgtgc | ccggctgcgg | 1440 |
| cccaactccg | acaacgtac | cttggagctg | tgcgtcaccc | ggatgtggct | cgccgcgcgt | 1500 | |
| tgcggccgc | tcctggagtc | cctgcggcc | acgcggagc | cgagcggggg | tcccgtcccc | 1560 | |
| gtacggctcg | ccgcgcggac | gaccgcgtc | caggccagg | ccggcgtctt | ccagcggggc | 1620 | |
| ccggacaacg | cctcggtcg | gcaggccgaa | cagatcctgc | agggctgcgg | gctgtcgag | 1680 | |
| 30 | gagacgtacg | aggccctgga | gacggccctc | ttggctctcg | tccacgcgc | ccggctcgac | 1740 |
| ccggcgctgt | tctggtcgga | cccccgtctc | gccgaggccg | tggagcggcg | gtcgctcgcc | 1800 | |
| tggaggccgg | tcttcgcgc | gaccgggggg | atgatcgcga | tccgctgcgg | cgacccctcg | 1860 | |
| acggcgccgg | agcggccga | gtccgcgtc | tcccacgcgg | cgccggagag | ctggggcctc | 1920 | |
| ccgcgtggca | tgccttc | cgcgctgtc | ctcgccgtca | cgaggccgg | cgagtacgaa | 1980 | |
| 35 | caggcggagc | gggtctcg | gcagccgg | ccggacgcga | tgttcgactc | gcccgcacggc | 2040 |
| atggagtaca | tgcacgc | ggggccgtac | tggctggcga | ccggccggct | gcacgcggcg | 2100 | |
| ctggcgagt | tcatgtctg | cgggagatc | ctggcagatc | gaaacctcga | ccagccctcg | 2160 | |
| atcgtgcct | ggcggac | ccgcgc | gtgtac | ggctcg | ccgcgcagaag | 2220 | |
| gccaggccgc | tggccgaggc | ccagctcg | ctggcgc | ccggcgc | ccgcacccgg | 2280 | |
| 40 | ggtctcaccc | tgccggct | ggcggccggc | gtggacggc | gcccgtcgac | 2340 | |

| | | | | | | | |
|------------|---|-------------------------|------------|------------|------------|------------|------|
| gccgaggcgg | tcgacatgct | gcacgacagc | ggcgaccggc | tgcAACACGC | ccgcgcgc | 2400 | |
| gccggatga | gccGCCACCA | gcaggcccag | ggggacaact | accgggcgag | gatgacggcg | 2460 | |
| cgctcgccg | gcgacatggc | gtgggcctgc | ggcgcgtacc | cgtggccga | ggagatcg | 2520 | |
| ccggccgcg | gcggccgccc | ggcgaaggcg | gtgagcacgg | agctggaact | gccgggcggc | 2580 | |
| 5 | ccggacgtcg | gcctgcgtc | ggaggccgaa | cgccgggtgg | cggccctggc | agcccgagga | 2640 |
| ttgacgaacc | gccagatagc | gcccggc | tgcgtaccg | cgagcacgg | cgaacagcac | 2700 | |
| ctgacgcgcg | tctaccgcaa | actgaacgtg | acccgcccag | cagacctccc | gatcagc | 2760 | |
| gcccaggaca | agtccgtcac | ggcctga | | | | 2787 | |
| 10 | <210> | 41 | | | | | |
| | <211> | 928 | | | | | |
| | <212> | PRT | | | | | |
| | <213> | Streptomyces venezuelae | | | | | |
| 15 | <400> | 41 | | | | | |
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| 1 | 1 | 5 | 10 | | 15 | | |
| | Leu Asp Ala Ser Ala Ala Gly Asp Gly Thr Leu Leu Leu Val Ser Gly | | | | | | |
| | 20 | 20 | 25 | | 30 | | |
| 20 | Pro Ala Gly Ser Gly Lys Thr Glu Leu Leu Arg Ser Leu Arg Arg Leu | | | | | | |
| | 35 | 35 | 40 | | 45 | | |
| | Ala Ala Glu Arg Glu Thr Pro Val Trp Ser Val Arg Ala Leu Pro Gly | | | | | | |
| | 50 | 50 | 55 | | 60 | | |
| | Asp Arg Asp Ile Pro Leu Gly Val Leu Cys Gln Leu Leu Arg Ser Ala | | | | | | |
| 25 | 65 | 65 | 70 | 75 | 80 | | |
| | Glu Gln His Gly Ala Asp Thr Ser Ala Val Arg Asp Leu Leu Asp Ala | | | | | | |
| | 85 | 85 | 90 | | 95 | | |
| | Ala Ser Arg Arg Ala Gly Asn Leu Thr Ser Pro Ala Asp Ala Pro Leu | | | | | | |
| | 100 | 100 | 105 | | 110 | | |
| 30 | Arg Val Asp Glu Thr His Arg Leu His Asp Trp Leu Leu Ser Val Ser | | | | | | |
| | 115 | 115 | 120 | | 125 | | |
| | Arg Arg Thr Pro Phe Leu Val Ala Val Asp Asp Leu Thr His Ala Asp | | | | | | |
| | 130 | 130 | 135 | | 140 | | |
| | Thr Ala Ser Leu Arg Phe Leu Leu Tyr Cys Ala Ala His His Asp Gln | | | | | | |
| 35 | 145 | 145 | 150 | 155 | 160 | | |
| | Gly Gly Ile Gly Phe Val Met Thr Glu Arg Ala Ser Gln Arg Ala Gly | | | | | | |
| | 165 | 165 | 170 | | 175 | | |
| | Tyr Arg Val Phe Arg Ala Glu Leu Leu Arg Gln Pro His Cys Arg Asn | | | | | | |
| | 180 | 180 | 185 | | 190 | | |
| 40 | Met Trp Leu Ser Gly Leu Pro Pro Ser Gly Val Arg Gln Leu Leu Ala | | | | | | |

| | | |
|--|-----|-----|
| 195 | 200 | 205 |
| His Tyr Tyr Gly Pro Glu Ala Ala Glu Arg Arg Ala Pro Ala Tyr His | | |
| 210 | 215 | 220 |
| Ala Thr Thr Gly Gly Asn Pro Leu Leu Leu Arg Ala Leu Thr Gln Asp | | |
| 5 225 | 230 | 235 |
| Arg Gln Ala Ser His Thr Thr Leu Gly Ala Ala Gly Gly Asp Glu Pro | | |
| 245 | 250 | 255 |
| Val His Gly Asp Ala Phe Ala Gln Ala Val Leu Asp Cys Leu His Arg | | |
| 260 | 265 | 270 |
| 10 Ser Ala Glu Gly Thr Leu Glu Thr Ala Arg Trp Leu Ala Val Leu Glu | | |
| 275 | 280 | 285 |
| Gln Ser Asp Pro Leu Leu Val Glu Arg Leu Thr Gly Thr Thr Ala Ala | | |
| 290 | 295 | 300 |
| Ala Val Glu Arg His Ile Gln Glu Leu Ala Ala Ile Gly Leu Leu Asp | | |
| 15 305 | 310 | 315 |
| Glu Asp Gly Thr Leu Gly Gln Pro Ala Ile Arg Glu Ala Ala Leu Gln | | |
| 325 | 330 | 335 |
| Asp Leu Pro Ala Gly Glu Arg Thr Glu Leu His Arg Arg Ala Ala Glu | | |
| 340 | 345 | 350 |
| 20 Gln Leu His Arg Asp Gly Ala Asp Glu Asp Thr Val Ala Arg His Leu | | |
| 355 | 360 | 365 |
| Leu Val Gly Gly Ala Pro Asp Ala Pro Trp Ala Leu Pro Leu Leu Glu | | |
| 370 | 375 | 380 |
| Arg Gly Ala Gln Gln Ala Leu Phe Asp Asp Arg Leu Asp Asp Ala Phe | | |
| 25 385 | 390 | 395 |
| Arg Ile Leu Glu Phe Ala Val Arg Ser Ser Thr Asp Asn Thr Gln Leu | | |
| 405 | 410 | 415 |
| Ala Arg Leu Ala Pro His Leu Val Ala Ala Ser Trp Arg Met Asn Pro | | |
| 420 | 425 | 430 |
| 30 His Met Thr Thr Arg Ala Leu Ala Leu Phe Asp Arg Leu Leu Ser Gly | | |
| 435 | 440 | 445 |
| Glu Leu Pro Pro Ser His Pro Val Met Ala Leu Ile Arg Cys Leu Val | | |
| 450 | 455 | 460 |
| Trp Tyr Gly Arg Leu Pro Glu Ala Ala Asp Ala Leu Ser Arg Leu Arg | | |
| 35 465 | 470 | 475 |
| Pro Ser Ser Asp Asn Asp Ala Leu Glu Leu Ser Leu Thr Arg Met Trp | | |
| 485 | 490 | 495 |
| Leu Ala Ala Leu Cys Pro Pro Leu Leu Glu Ser Leu Pro Ala Thr Pro | | |
| 500 | 505 | 510 |
| 40 Glu Pro Glu Arg Gly Pro Val Pro Val Arg Leu Ala Pro Arg Thr Thr | | |

| | | |
|--|-----|-----|
| 515 | 520 | 525 |
| Ala Leu Gln Ala Gln Ala Gly Val Phe Gln Arg Gly Pro Asp Asn Ala | | |
| 530 | 535 | 540 |
| Ser Val Ala Gln Ala Glu Gln Ile Leu Gln Gly Cys Arg Leu Ser Glu | | |
| 5 545 | 550 | 555 |
| Glu Thr Tyr Glu Ala Leu Glu Thr Ala Leu Leu Val Leu Val His Ala | | |
| 565 | 570 | 575 |
| Asp Arg Leu Asp Arg Ala Leu Phe Trp Ser Asp Ala Leu Leu Ala Glu | | |
| 580 | 585 | 590 |
| 10 Ala Val Glu Arg Arg Ser Leu Gly Trp Glu Ala Val Phe Ala Ala Thr | | |
| 595 | 600 | 605 |
| Arg Ala Met Ile Ala Ile Arg Cys Gly Asp Leu Pro Thr Ala Arg Glu | | |
| 610 | 615 | 620 |
| Arg Ala Glu Leu Ala Leu Ser His Ala Ala Pro Glu Ser Trp Gly Leu | | |
| 15 625 | 630 | 635 |
| Ala Val Gly Met Pro Leu Ser Ala Leu Leu Ala Cys Thr Glu Ala | | |
| 645 | 650 | 655 |
| Gly Glu Tyr Glu Gln Ala Glu Arg Val Leu Arg Gln Pro Val Pro Asp | | |
| 660 | 665 | 670 |
| 20 Ala Met Phe Asp Ser Arg His Gly Met Glu Tyr Met His Ala Arg Gly | | |
| 675 | 680 | 685 |
| Arg Tyr Trp Leu Ala Thr Gly Arg Leu His Ala Ala Leu Gly Glu Phe | | |
| 690 | 695 | 700 |
| Met Leu Cys Gly Glu Ile Leu Gly Ser Trp Asn Leu Asp Gln Pro Ser | | |
| 25 705 | 710 | 715 |
| Ile Val Pro Trp Arg Thr Ser Ala Ala Glu Val Tyr Leu Arg Leu Gly | | |
| 725 | 730 | 735 |
| Asn Arg Gln Lys Ala Arg Ala Leu Ala Glu Ala Gln Leu Ala Leu Val | | |
| 740 | 745 | 750 |
| 30 Arg Pro Gly Arg Ser Arg Thr Arg Gly Leu Thr Leu Arg Val Leu Ala | | |
| 755 | 760 | 765 |
| Ala Ala Val Asp Gly Gln Gln Ala Glu Arg Leu His Ala Glu Ala Val | | |
| 770 | 775 | 780 |
| Asp Met Leu His Asp Ser Gly Asp Arg Leu Glu His Ala Arg Ala Leu | | |
| 35 785 | 790 | 795 |
| Ala Gly Met Ser Arg His Gln Gln Ala Gln Gly Asp Asn Tyr Arg Ala | | |
| 805 | 810 | 815 |
| Arg Met Thr Ala Arg Leu Ala Gly Asp Met Ala Trp Ala Cys Gly Ala | | |
| 820 | 825 | 830 |
| 40 Tyr Pro Leu Ala Glu Glu Ile Val Pro Gly Arg Gly Gly Arg Arg Ala | | |

| | | |
|--|---|--|
| 835 Lys Ala Val Ser Thr Glu Leu Glu Leu Pro Gly Gly Pro Asp Val Gly 850 | 840 Leu Leu Ser Glu Ala Glu Arg Arg Val Ala Ala Leu Ala Ala Arg Gly 865 | 845 860 870 875 880 885 890 895 900 905 910 915 920 925 |
| Leu Thr Asn Arg Gln Ile Ala Arg Arg Leu Cys Val Thr Ala Ser Thr Val Glu Gln His Leu Thr Arg Val Tyr Arg Lys Leu Asn Val Thr Arg 10 Arg Ala Asp Leu Pro Ile Ser Leu Ala Gln Asp Lys Ser Val Thr Ala | | |
| 15 <210> 42 <211> 27 <212> DNA <213> <i>Streptomyces venezuelae</i> | | |
| 20 <400> 42 cccgaaattcg ccgccgcccggccat ggccgaa 27 <210> 43 <211> 35 <212> DNA <213> <i>Streptomyces venezuelae</i> | | |
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| 20 | ttccgcttct cggaggagct gcacccctcc gtcgaggccc tgcgtgtgca gtatccggc 180 | |
| | cgccaggacc ggcgtgccga gccgtgtctg gagagcgtcg aggagctcgc cgagcatgtg 240 | |
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| Ala Gly Gly Ser Ala Ser Tyr Phe Phe Arg Phe Ser Glu Glu Leu His | | | |
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| Pro Ser Val Glu Ala Leu Ser Val Gln Tyr Pro Gly Arg Gln Asp Arg | | | |
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| Arg Ala Glu Pro Cys Leu Glu Ser Val Glu Glu Leu Ala Glu His Val | | | |
| 65 | 70 | 75 | 80 |
| 10 | val Ala Ala Thr Glu Pro Trp Trp Gln Glu Gly Arg Leu Ala Phe Phe | | |
| | 85 | 90 | 95 |
| Gly His Ser Leu Gly Ala Ser Val Ala Phe Glu Thr Ala Arg Ile Leu | | | |
| | 100 | 105 | 110 |
| Glu Gln Arg His Gly Val Arg Pro Glu Gly Leu Tyr Val Ser Gly Arg | | | |
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| Arg Ala Pro Ser Leu Ala Pro Asp Arg Leu Val His Gln Leu Asp Asp | | | |
| | 130 | 135 | 140 |
| Arg Ala Phe Leu Ala Glu Ile Arg Arg Leu Ser Gly Thr Asp Glu Arg | | | |
| 145 | 150 | 155 | 160 |
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| | 165 | 170 | 175 |
| Ser Asp Tyr Lys Ala Ala Glu Thr Tyr Leu His Arg Pro Ser Ala Lys | | | |
| | 180 | 185 | 190 |
| Leu Thr Cys Pro Val Met Ala Leu Ala Gly Asp Arg Asp Pro Lys Ala | | | |
| 25 | 195 | 200 | 205 |
| Pro Leu Asn Glu Val Ala Glu Trp Arg Arg His Thr Ser Gly Pro Phe | | | |
| | 210 | 215 | 220 |
| Cys Leu Arg Ala Tyr Ser Gly Gly His Phe Tyr Leu Asn Asp Gln Trp | | | |
| 225 | 230 | 235 | 240 |
| 30 | His Glu Ile Cys Asn Asp Ile Ser Asp His Leu Leu Val Thr Arg Gly | | |
| | 245 | 250 | 255 |
| Ala Pro Asp Ala Arg Val Val Gln Pro Pro Thr Ser Leu Ile Glu Gly | | | |
| | 260 | 265 | 270 |
| Ala Ala Lys Arg Trp Gln Asn Pro Arg | | | |
| 35 | 275 | 280 | |